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Attorney Docket No. 47, 958 - CPA (70000)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPLICANT: Katsuya Nakagawa   EXAMINER: Nguyen, J.

U.S.S.N.:   09/006,363   GROUP: 2673

FILED: January 13, 1998

FOR: VIRTUAL KEYBOARD

Commissioner of Patents and Trademarks
Washington, D.C. 20231

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CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Box AF, the Commissioner for Patents, Washington, D.C. 20231 on February 4, 2004.

By: _____
        William J. Daley, Jr.

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BRIEF ON APPEAL

Sir:

This is an appeal from the final rejection of March 4, 2003 of claims 1-25. Three copies

of this Brief are enclosed.

It should be noted that claims 1-25 were first rejected in a Final Office Action mailed

March 26, 2003, an appeal of that rejection was taken and an appeal brief dated December 23,

2002 was filed in the USPTO. In response to the filing of the appeal brief, it appears prosecution

was re-opened for the limited purposes of mailing a second final rejection. As such, the within

Brief includes arguments that separately addresses the arguments included in the March 4, 2003

Final Rejection that were for the first time directed to the Declaration that had been filed in response to the first Final Rejection.

BRIEF ON APPEAL FEE

A check for $320.00, the required fee for filing a Brief on Appeal, is enclosed herewith.

REAL PARTY IN INTEREST

The real party in interest is Sharp Kabushiki Kaisha. The assignment of the inventors to this corporation was recorded on January 13, 1998 at Reel 8954 and Frame 0033.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to Appellant, Appellant's legal representative or the assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

STATUS OF THE CLAIMS

Claims 1-25 stand final rejected and are the only claims that are pending on appeal.

STATUS OF THE AMENDMENTS

There are no amendments after final to the claims.

A clean set of the claims on appeal is set forth in the Appendix, Tab A hereto.

SUMMARY OF THE INVENTION

The present invention is drawn to a virtual keyboard, such as that shown in FIG. 4, that includes a display 1 for displaying a keyboard image 2, a transparent pressure-sensitive panel 3 that is disposed on the display and a processor, processing means or computing portion 4 that

receives position information from the pressure sensitive panel, and based on such position information, outputs a code corresponding to the character representative of the key or combination of keys pushed by the user. As more particularly described hereinafter, the virtual keyboard of the present invention is configured and arranged so as to allow a user to create or input an uppercase character such as a capital letter or other character for keys by pressing a shift key in combination with a desired character key much the same way as is done with conventional keyboards. The present invention also is directed to methods for determining one of a plurality of general keys of a virtual keyboard being pushed in combination with a special key.

As is shown in FIG. 1, the transparent pressure-sensitive panel is made up of a large number of transparent resistance wires 10 (e.g., several hundreds to several thousands) densely arranged along the X-axis and Y-axis of the pressure sensitive panel. Two pair of electrodes 11 are also provided, where all of the transparent resistance wires 10 arranged along the X-axis are electrically coupled to one pair of electrodes and where all of the transparent resistance wires 10 arranged along the Y-axis are electrically coupled to the other pair of electrodes. It should be recognized that with such an arrangement, the ends of the transparent resistance wires 10 are not electrically isolated from each other but rather are all connected to an electrode.

Referring now to FIGS. 2A,B the operative principle of a pressure sensitive panel is described for the case where pressure is applied to a single point, for example point 20, on a pressure-sensitive panel. When pressure is applied to a single point, point 20, two resistance wires in the X-direction and the Y-direction conduct at the point 20. At this time, a voltage (e.g., V0) is applied across the pair of electrodes 11 for the resistance wires 10 along the X-axis, as is more clearly shown in FIG. 2A. Consequently, an output is obtained or provided across the pair

of electrodes 11 for the resistance wires 10 along the Y-axis at both ends of the wire in the Y-axis direction that is in conduct with the wire in the X-axis direction at the point 20. The output value corresponds to a divided resistance; namely $V0 * [RX2/(RX1 + RX2)]$. The output value is amplified and represents a Cartesian coordinate position of point 20 in the X-direction.

Similarly, a voltage (e.g., V0) also is applied across the pair of electrodes 11 for the resistance wires 10 along the Y-axis, as is more clearly shown in FIG. 2B. Consequently, an output is obtained or provided across the pair of electrodes 11 for the resistance wires 10 along the X-axis at both ends of the wire in the X-axis direction that is in conduct with the wire in the Y-axis direction at the point 20. The output value also corresponds to a divided resistance. The output value is amplified and represents a Cartesian coordinate position of point 20 in the Y-direction. Usually, sampling of the X and Y direction is accomplished by momentarily changing the state of the pressure-sensitive panel back and forth between the state of FIG. 2A and the state of FIG. 2B.

The computing portion 4 has a memory in which is stored data that correlates respective unit areas or keys of the key board image with coordinates of the pressure-sensitive panel and an output code corresponding to the unit areas or keys of the keyboard. Thus, when an key of the keyboard image is pushed, the computing portion 4 detects the pushed position by sampling outputs of the pressure-sensitive panel, identifies the pushed key by comparing the detected position with the stored coordinate data and generates the corresponding code. In this way, a user can input a lower case character, such as a lower case alphabetic character, a number or punctuation marks, by pushing down on a desired character key 51 and correspondingly the

pressure-sensitive panel, whereby the computing portion 4 outputs the code corresponding to the desired character.

Referring now to FIGS. 3 and 5-6, the operative principle of a pressure sensitive panel, and correspondingly the operation of the virtual keyboard of the present invention, is described for the case where an uppercase character is to be inputted by a user using the same technique as with a conventional keyboard. With a conventional keyboard, a user pushes a special key 52 (e.g., the shift key) and while keeping the special key pushed pushes the key, a general key 51 corresponding to the desired uppercase character and thereafter releases both the special and general keys in order to input an uppercase character. For example, a user would depress the shift key and then the letter "i" to input a capital I or depress the shift key and then the key for numeral "8" so as to input an asterisk "*" and thereafter release the shift key and the depressed key for the character (e.g., "i" or number "8").

When pressure is applied to both the special and general keys 52, 51, and correspondingly to the pressure sensitive panel at the corresponding locations, a resistance wire in each of the X-direction and the Y-direction in the pressure-sensitive panel conduct at a location corresponding to the special key 52 and a resistance wire in the X-direction and the Y-direction conduct at a location corresponding to the general key. At this time, a voltage (e.g., V0) is applied across the pair of electrodes 11 for the resistance wires 10 along the X-axis, as is more clearly shown in FIG. 3. Consequently, an output is obtained or provided across the pair of electrodes 11 for the resistance wires along the Y-axis at both ends of both wires in the Y-axis direction that are each in conduct with a corresponding one of the two wires in the X-axis direction. As shown in FIG. 3, the voltage obtained across the electrodes in the Y-axis direction is an average output of the

two pushed points. As further described in the subject application, the average output

corresponds to a substantially middle position between the two points in the X-axis direction.

Similarly, an output corresponding to a substantially middle position between the two points in

the Y-axis direction also can be obtained.

As herein described and as more clearly shown in FIG. 5, when the special key 52 is

initially pressed or pushed, the computing portion 4, by sampling the outputs from the pressure-

sensitive panel, determines the coordinates (X1, Y1) for the position 53 of the initially pressed

special key. When both the special and general keys 52, 51 are pressed or pushed, the computing

portion 4 again samples the outputs from the pressure-sensitive panel and determines the

coordinates (X2, Y2) for the position 55 that corresponds to the middle position or the return

position between the special key and the general keys. Using the coordinates determined for both

the position 53 of the special key and the position 55 of middle position, the computing portion

determines the coordinates (Xn, Yn) of the position 54 of the general key 51. Basically, by

calculating a doubled vector from the start point corresponding to the position 53 of the special

key to the middle position 55, the coordinates of the position 54 of the general key 51 that is

being pressed or pushed in combination with the special key can be determined or calculated by

the computing portion 4.

As indicated above, the computing portion 4 has a memory in which is stored data that

correlates respective unit areas or keys of the keyboard image with coordinates of the pressure-

sensitive panel and an output code corresponding to the unit areas or keys of the keyboard. Thus,

by comparing the determined or calculated coordinates of the position 54 of the general key 51

with the stored coordinate data, the computing portion 4 generates the code corresponding to the

pushed general key. In this way, a user can input an upper case character, such as an upper case alphabetic character, by using the keyboard inputting technique for a conventional keyboard as herein described.

Also provided herewith in the Appendix, Tab B is an explanation of how one can determine the furthest returning position without knowing the position of the general key, when both the special and general keys are being pushed at the same time. The explanation provided herewith was previously submitted by Applicant along with Applicant's Response dated June 26, 2002.

ISSUE(S)

The issues on Appeal as to the rejections are:

1. Whether claims 1 and 4 are obvious within the meaning of 35 U.S.C. § 103 by Ouellette et al. [USP 5,581,243; "Ouellette"].

2. Whether claims 2, 3, 5-18, 20, 22 and 24 are obvious within the meaning of 35 U.S.C. § 103 by Ouellette et al. [USP 5,581,243; "Ouellette"] as applied to claims 1 and 4 and further in view of Dunthorn [USP 4,914,624].

3. Whether claim 19 is obvious within the meaning of 35 U.S.C. § 103 by Ouellette et al. [USP 5,581,243; "Ouellette"] as applied to claim 1 and further in view of Yoshikawa [USP 5,392,035].

4. Whether claims 21, 23 and 25 are obvious within the meaning of 35 U.S.C. § 103 by Ouellette et al. [USP 5,581,243; "Ouellette"] in view of Dunthorn [USP 4,914,624] as applied to claims 7, 11 and 14 and further in view of Yoshikawa [USP 5,392,035].

5. Whether claim 19 is obvious within the meaning of 35 U.S.C. § 103 by Ouellette et al. [USP 5,581,243; "Ouellette"] as applied to claim 1 and further in view of Applicant's Admitted Prior Art ["AAPA"].

6. Whether claims 21, 23 and 25 are obvious within the meaning of 35 U.S.C. § 103 by Ouellette et al. [USP 5,581,243; "Ouellette"] in view of Dunthorn [USP 4,914,624] as applied to claims 7, 11 and 14 and further in view of Applicant's Admitted Prior Art ["AAPA"].

GROUPING OF THE CLAIMS

All claims do not stand or fall together for the purpose of the present appeal. Rather for purposes of the present appeal, the claims on appeal stand as fall as follows:

Claims 1 and 4 stand or fall together.

Claims 2, 3, 5-18, 20, 22 and 24 stand and fall together, however, because claims 2-3 and 5-6 are in dependent form, they will stand if, respective, claims 1 and 4 stand.

Claim 19 stands and falls alone, however, because this claim is in dependent form, this claim will stand if claim 1 stands.

Claims 21, 23 and 25 stand and fall together, however, because these claims are in dependent form, they will stand if, respective, claims 7, 11 and 14 stand.

ARGUMENT

As provided above, all the claims do not stand and fall together as to either of the issues on appeal. As such, as to each issue Applicant has provided a separate argument as to each claim or group of claims applicable for that issue as indicated above. Unless otherwise indicated, any

reference hereinafter in the Argument to specific reference numerals, pages or figures shall be to the pages and the drawing figures of the subject application and the reference numerals used therein. Also, like reference characters denote corresponding parts.

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FIRST ISSUE

**CLAIMS 1 AND 4 ARE NOT OBVIOUS WITHIN THE MEANING OF
35 U.S.C. §103 BY OUELLETTE ET AL. [USP 5,581,243; "OUELLETTE"]**

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In the grounds for the rejection it is asserted that Ouellette discloses a virtual keyboard comprising a display for displaying keyboard, a transparent pressure-sensitive panel disposed on the display in a processor for receiving information positions detected and sent in a time sequence from the pressure sensitive panel when any key in the keyboard is pushed, identifying the position of the pushed key according to a coded electrical signal corresponding to the touched locations and outputting a code corresponding to a pushed key. It also is asserted that Ouellette teaches a well-known virtual keyboard functioning as a conventional keyboard or typewriter (see col. 1, lines 51-63). It is further asserted that Ouellette, in other words, teaches a well-known virtual keyboard having a function that when a special key is first pushed and thereafter when both of the special key and the general key a pushed at the same time, a code corresponding to the combination of the pushed special key in the general key is output, thereby displaying a character corresponding to the code. In addition, it is asserted that it would have been obvious to one skilled in the art to utilize the well-known virtual keyboard's function in Ouellette because this would allow the user to operate a virtual keyboard in the same manner/fashion as a user operating a conventional keyboard. The grounds for rejection, concludes that it therefore, would have been obvious to obtain the claimed invention as specified in the claims. Applicant

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respectfully disagrees with the characterization of what is taught and disclosed in the cited reference as well as the suggestion that it would have been obvious to combine what is supposed to be prior art to the invention disclosed in Ouellette with that invention.

Applicant would first note that the cited reference nowhere explicitly describes, teaches or suggests that when a special key is first pushed and thereafter when both of the special key and the general key a pushed at the same time, a code corresponding to the combination of the pushed special key in the general key is output, thereby displaying a character corresponding to the code. Rather, this alleged teaching apparently is being inferred from the following language in Ouellette, which inference Applicant respectfully submits is incorrect and moreover is inconsistent with the full disclosure of the cited reference.

> For typing on the simulated keyboard, the user touches the touch-sensitive-screen on the displayed key in the same fashion that a typist who uses a conventional typewriter. The "touches" on the display caused the generation of coded electrical signals corresponding to the locations that are touched, and thereby representing the displayed characters (e.g., capital or lower case letters depending on whether the displayed shift key is touched) or functions selected by the user. The coded electrical signals then are processed by the computer in the same manner that it would process the electric signals generated by conventional keyboard input device. Ouellette, col. 1, lines 51-63.

As is more specifically detailed below at the time of the invention disclosed in Ouellette, it was *not* possible to separately determine each position of two areas being touched on a pressure sensitive panel using a divided resistance technique. As such it was *not* possible to follow or use the typing technique used with conventional keyboards or typewriters. Stated another way, a

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virtual keyboard embodying such a conventional pressure-sensitive panel cannot be operated or function in the same way as a conventional keyboard (i.e., cannot depress the shift key and while keeping the shift key depressed also depress the letter, number or punctuation key at the same time so as to output a capitalized letter or a punctuation mark residing in the upper case mode).

As provided in the Declaration of Katsuya Nakagawa[1] (copy provided herewith in the Appendix, Tab C) conventional pressure-sensitive panels, such as those embodying the divided resistance technique for determining position, are configured and arranged so that only one X position can be determined at a time and only one Y-position can be determined at a time. See Declaration, Paragraphs 4-7.

It is further provided in paragraph 7 of the Declaration that because all of the wires extending in the X-direction are all electrically connected to the one terminal electrode pair and because all of the wires extending in the Y-direction are all electrically connected to another terminal electrode pair, if pressure is applied to more than one point on the pressure sensitive panel, for example two points, one **cannot** determine the X, Y coordinate corresponding to each point where pressure is being applied. This is so because in a pressure-sensitive panel the output is across the *terminal electrode pair* **not** across the *individual wires* connected to the electrode terminal pair.

Rather, if two or more areas of such a pressure-sensitive panel are pushed at the same time, a single X-position and a single Y- position representative of the divided resistances of the two or more areas being pushed is outputted. This is also discussed in connection with Fig. 3 of the subject application. The electrical configuration of such a pressure-sensitive panel does not

allow one to separately determine the two or more areas of the panel being pushed at the same time. See Declaration, Paragraphs 7-8.

With conventional keyboards each of the keys are uniquely identifiable when the key is depressed. Therefore, one can use a conventional typing technique employing the shift key to switch between the lower case and upper case modes or functionalities. In such a conventional typing technique, the shift key is depressed and thereafter, while keeping the shift key depressed, the desired letter, number or punctuation key is depressed corresponding to the upper case character to be outputted, printed, displayed on the screen, etc. See Declaration, paragraphs 8-9.

Because two areas of a conventional pressure-sensitive panel cannot be separately determined when they are pushed at the same time, when a pressure-sensitive panel is employed in a conventional virtual keyboard a different typing technique is used to switch between the lower case and upper case modes or functionalities. In this virtual keyboard technique the area corresponding to the shift key is depressed and released so as to put the virtual keyboard in the upper case mode. Then the area corresponding to the key for the desired upper case letter or punctuation mark is depressed and released. If the upper case mode is no longer required, then the area corresponding to the shift key is again depressed and released so as to return the virtual keyboard to the lower case mode. See Declaration, Paragraphs 7-8 and 10-12.

It also should be recognized that this one touch at a time virtual keyboard operation is disclosed in the principal reference cited in connection with the prosecution of the Ouellette patent, namely Auer at al. [USP 4,725,694, "Auer"]. See for example, Figure 7 and the discussion at col. 5, lines 1-20 thereof. See also Dunthorn [USP 4,914,624], col. 1, lines 10-55.

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[1] Declaration was previously submitted with Applicant's Response dated November

As to the alleged teachings or disclosures in Ouellette, the Declaration clearly provides that the discussion cited in column 5 merely describes the one touch process described above. It does not describe at all a process where more than one key of a virtual keyboard or more than one area of a pressure-sensitive panel is pushed at the same time.

The Declaration also clearly indicates that whatever the discussion being referred to in column 1 of Ouellette was intended to convey, it *cannot* mean that one could use a conventional typing technique when pushing the keys of a virtual keyboard embodying a conventional pressure-sensitive panel. Stated another way, and contrary to the apparent inference being drawn in the Office Action, a virtual keyboard embodying a conventional pressure-sensitive panel *cannot* be operated or *cannot* function in the same way as a conventional keyboard. See Declaration, paragraphs 14-20.

As to the "touched the same as" language in column 1, it should be remembered that a stylus or pen also was being used to touch pressure-sensitive panels. See for example one of the previously identified patents USP 5,457,454.

It also should be recognized that the specific technique describe in the Detailed Description of the Preferred Embodiment section of Ouellette does not mention or describe a technique where the position of a general key involved with an uppercase process is determined by position information obtained while pressing the special key (e.g., shift key) and thereafter pressing both of the special and general keys. Rather, the best mode described in Ouellette is the one where the X and Y positions of a singular touch is determined. It appears somewhat inconsistent to be combining a technique that is supposedly old in the art for the invention of

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21, 2001.

Ouellette on the grounds that it would be better than what is disclosed as the best mode for carrying out the invention described in Ouellette.

Moreover, it should be recognized that whatever the language in column 1, lines 51-63 is intended to mean, it is completely silent and lacks any detail as to how to (e.g., method or structure) the function of the described conventional virtual keyboard is accomplished. Given that the Declaration and the subject application clearly provide a technical basis why a conventional pressure-sensitive panel cannot yield the location of a general key if a special key and a general key are pushed at the same time, it cannot be said that one skilled in the art would have been apprised of the scope of the invention allegedly disclosed in column 1 of Ouellette.

As was indicated by Applicant early on during prosecution, the statement in column 1, lines 52-54 that the user touches the touch-sensitive-screen on the displayed keys in the same fashion as that a typist uses a conventional keyboard, *is an over simplified statement* of the process and in no way suggests how or that one can determine the position of a one key using the position of the general key when a special and general key are being pushed at the same time. Stated another way, for this statement to be considered by one skilled in the art as not being erroneous or incorrect representation of the process for inputting an uppercase character using a virtual keyboard employing a pressure-sensitive panel, the statement has to be an oversimplification of the actual process.

Additional Remarks Directed to Second Final Rejection

In the Final Rejection mailed March 26, 2002, the detailed remarks had not addressed the Declaration submitted by Applicant that had been filed is Response to the first Final Office

Action. Thus, and following submission of Applicant's first Brief on Appeal, a second Final Rejection was mailed March 4, 2003, again rejecting the claims and providing that the Declaration was insufficient to overcome the rejection of the claims because it fails to set forth facts. The second Final Office Action (see pages 2 - 3 thereof) also indicated that the disclosure in Ouellette (col. 1, lines 27-63) "provides a well known pressure [sic.] sensitive keyboard, which allows the user touching the displayed keys in the same fashion that a typist uses a conventional keyboard, e.g., in order to display a capital "A", a special key "Shift" is first pushed and thereafter when both of the special key "Shift" and a general key "a" are pushed at the same time, the keyboard outputs a "A" code corresponding to pushed combination of the special key "Shift" and the general key "a", and a capital "A" is thereby displayed on the screen."

The second Final Office Action also notes that "it" (i.e., the declaration) "refers(s) only to the system in the described application and not to the individual claims of the application." It also is stated therein that "[t]hus, there is no showing that the objective evidence of non-obviousness is commensurate with the claims." It is further stated, that the specific structure of the pressure sensitive panel and the method of determining where the pressure sensitive panel is being touched (including applying voltages across the terminal electrode pairs), as described in paragraphs 4-8 of [the] Declaration, are not recited in the claims, e.g., see independent claim1. Further, the virtual keyboards of the present invention and Ouellette are the same type of resistive pressure sensitive panel (citations omitted)."

It appears that the Examiner has apparently overlooked paragraphs 3 and 10-18 and more particularly paragraphs 19-20 of the Declaration and has focused the rejection on the discussion set forth in paragraphs 4-8.

It first should be noted that the cited language referred to in Ouellette does not contain any specific recitation to a particular structure beyond that of a touch-sensitive screen that generates coded electrical signals corresponding to locations that are touched and a computer that processes the coded electrical signals in the same manner it would process the electrical signals generated by conventional keyboard. Thus, it appears that the language is being used to infer the structure of the virtual keyboard as set forth in claim 1 based on the functions of the pressure-sensitive keyboard that are claimed to be asserted by the language recited in Ouellette. In other words structure of a virtual keyboard is being inferred based on functional language provided in Ouellette and not because the language in Ouellette specifically asserts or describes the specific structure of the keyboard as is set forth in the claims of the present invention.

Paragraph 3 of the Declaration provided by Applicant, indicates that "[b]efore discussing the references, it is first necessary to understand the operations and limitations of a transparent pressure sensitive panel as described in the present invention and as is known to those skilled in the art." Thus, Applicant described in paragraphs 4-8 the structure and operation of a conventional pressure-sensitive panel and also by reference to figures contained in the subject application. It is specifically indicated in paragraphs 7-8 of the Declaration that a conventional pressure sensitive panel can only provide one electrical coded signal at a time, regardless of how many keys are being pressed at one time. In other words, it is physically impossible to separately determine the locations of each area or key being pushed at the same time. It also is clearly indicated in paragraph 8, that the location signal that would be outputted is for a location that does not correspond to the location of either of the keys being pushed or the areas on the pressure sensitive panel being pushed, if more than one key is being pushed at the same time.

Thereafter in paragraphs 9-10[2] the Declaration describes the general structure and function of a conventional keyboard. Although not included with the Declaration, an illustrative photograph of a commercially available keyboard for use with a computer system is attached herewith as Appendix E. This illustrates the general arrangement of the keys corresponding to the special and general keys referred to in the subject application as they would appear on a conventional keyboard at the time the application for Ouellette was filed in the USPTO.

It is indicated in the second paragraph 10[3] of the Declaration that the design or structure of a conventional pressure sensitive panel makes it *physically and electrically impossible* to provide separate indications of each location or area being pushed if these locations or areas are being pushed at the same time. Thus, it necessarily follows that a typist cannot use the process for capitalizing a letter one would be used when using a conventional keyboard when they use a pressure-sensitive panel.

The discussion that follows in paragraphs 11-12 of the Declaration then sets forth the process that has to be followed when using a conventional pressure-sensitive panel namely because the design or structure of a conventional pressure sensitive panel makes it *physically and electrically impossible* to provide separate indications of each location or area being pushed if these locations or areas are being pushed at the same time. As stated in these paragraphs the procedure that is followed when using such a pressure-sensitive is the depression of the special "shift" key, releasing of the special key, depression of the general key (e.g., alpha character "a"), releasing the general key, depression of the special key and releasing the special key. This is the

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[2] It appears that there are two paragraph nos. 10 in the Declaration, the one referred to here is the paragraph 10 starting page 3 and carrying over onto page 4 of the Declaration.

procedure followed because a pressure-sensitive panel only outputs a signal representative of one location at a time.

This can be further illustrated by reference to the illustrative photograph included in Appendix E. If the left hand shift key and the letter "i" key where depressed at the same time, the electrical coded signal being outputted would not correspond to either the shift key or the "i" key as is explained and described in the Declaration. Rather, and as taught in the subject application, a signal would be outputted corresponding to a location that lies on a line between these two keys and at a mid-point between these two keys. For the keyboard shown in Appendix E, the distance between the centers of the shift key and the letter "i" key is approximately six (6) inches. Thus, if both keys were depressed at the same time the location that would be outputted corresponding to a mid-point between these two keys would be about three (3) inches. It should be noted that such a location physically corresponds to the location of the letter "f" key on this keyboard.

After discussing both the structure and operation of a conventional pressure-sensitive panel, a conventional keyboard, the differences between the conventional keyboard and a conventional pressure–sensitive panel (i.e., paragraphs 3- 5), the Declaration (paragraphs 14-15) next refers to the discussion of the description relating to the invention being claimed in Ouellette. These paragraphs of the Declaration indicate that the detailed description for the invention be claimed in Ouellette does not anywhere describe the concept of touching more than one area of the screen at a time.

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[3] The paragraph no. 10 appearing on page 4 of the Declaration.

The Declaration then ends (i.e., paragraphs 16-20) with the discussion directed to the language in Ouellette being specifically asserted in both of the Final Office Actions as disclosing a pressure sensitive panel having the structure of the virtual keyboard of claim 1. Specifically paragraph 19 states, *inter alia*:

> As indicated in the discussion above in paragraphs 4-12, at the time the application maturing into the Ouellette patent was filed, a touch sensitive panel was limited by its construction so it could be used to only determine the x-, y-coordinates of **an** area being touched. If more than one area were touched at the same time, the position being determined would not correspond to either of the areas being touched. See also paragraphs 7-8 above.

> Moreover paragraph 20 of the Declaration further states:
> Thus, and contrary to the inference and conclusion being drawn in the Office Action, a virtual keyboard including a touch or pressure sensitive panel **cannot** function the same way as a conventional keyboard.

In sum, Applicant has clearly demonstrated in the Declaration that the assertion in both the first and second Final Office Actions that Ouellette (col. 1, lines 27-63) "provides a well known pressure [sic.] sensitive keyboard, which allows the user touching the displayed keys in the same fashion that a typist uses a conventional keyboard, namely touching special key first and thereafter pushing both of the special key and a general key at the same time so that the pressure sensitive keyboard can output a code corresponding to pushed combination of the special key and the general key is an *incorrect assertion* of the structure and function of a conventional pressure-sensitive keyboard at the time the subject application for Ouellette was filed. The Examiner has

not offered in the first or second Final Office Actions any other evidence to overcome the evidence provide in the Declaration of the structure of a conventional pressure-sensitive panel, the way in which the structure for such a conventional pressure-sensitive panel functions and that only one location signal can be outputted from such a pressure sensitive panel responsive to the area or areas being pushed at the same time on the panel.

It necessarily follows that the language being cited to in Ouellette also cannot be used to assert the particular structure set forth in claim 1, namely *inter alia* a processor that receives information of positions detected and sent in a time sequence from the pressure sensitive panel when a special key is first pushed and thereafter when both of the special key and a general key are pushed at the same time, identifying a position of the pushed general key according to the received position information and outputting a code corresponding to the combination of the pushed special key and the general key corresponding to the identified position. It also necessarily follows that the language being cited to in Ouellette also cannot be used to assert the particular structure set forth in claim 4, namely *inter alia* a processor that receives information of positions detected and sent in a time sequence from the pressure sensitive panel when a special key is first pushed and thereafter when both of the special key and a general key are pushed at the same time, that identifies the pushed general key by determining a position of the pushed general key according to the received position information of the first pushed key and the pushed combination of the special key and the general key and that outputs a code corresponding to the combination of the pushed special key and the identified general key.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some

teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As provided above, the references cited, alone or in combination, include no such teaching, suggestion or motivation.

Furthermore, and as provided in MPEP 2143.02, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 19866). Additionally, it also has been held that if the proposed modification or combination would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. As can be seen from the forgoing discussion regarding the disclosures of the cited references, there is no reasonable expectation of success provided in any of the prior art references. Also, it is clear from the foregoing discussion that the modification suggested by the Examiner would change the principle of operation of the device disclosed in Ouellette.

It is respectfully submitted that for the foregoing reasons there is no teaching, nor is there any motivation or desire offered in Ouellette that would suggest to one skilled in the art to reconfigure the virtual keyboard disclosed therein so as to yield the virtual keyboard claimed by Applicant. Thus, for the foregoing reasons claims 1 and 4 are patentable over Ouellette.

SECOND ISSUE

CLAIMS 2, 3, 5-18, 20, 22 AND 24 ARE NOT OBVIOUS WITHIN THE MEANING OF 35 U.S.C. §103 BY OUELLETTE ET AL. [USP 5,581,243; "OUELLETTE"] IN VIEW OF DUNTHORN [USP 4,914,624]

In the grounds for the rejection, it is asserted that Ouellette discloses the claimed invention except that Ouellette does not disclose expressly in many words the detailed functions of the virtual keyboard as claimed. It is further asserted that Dunthorn discloses that a first button, obviously considered as a special key, is first pushed and thereafter when both of the first and a second button, obviously considered as a general key, are pushed at the same time, the touch screen returns information including a middle position between the two touched keys. In addition, it is asserted that it would have been obvious to one skilled in the art to identify the position of the second button from the received middle position. Thus, it is indicated that at the time of the invention, it would have been obvious to a person of ordinary skill in the art to recognize that Dunthorn remedies the deficiency of Ouellette in order to explain how the virtual keyboard may operate in the same manner as a conventional keyboard, as taught by Ouellette.

As more fully indicated in the discussion above regarding claims 1 and 4, Ouellette is deficient in a number of respects including the following.

(1.) Ouellette nowhere explicitly describes, teaches or suggests that when a special key is first pushed and thereafter when both of the special key and the general key a pushed at the same time, a code corresponding to the combination of the pushed special key in the general key is output, thereby displaying a character corresponding to the code. Rather, this alleged teaching apparently is being inferred from the language found in column 1 of Ouellette, which inference is incorrect and moreover is inconsistent with the full disclosure of the cited reference.

(2.) As is more specifically detailed above, at the time of the invention disclosed in Ouellette, it was *not* possible to separately determine each position of two areas being touched on a pressure sensitive panel using a divided resistance technique. As such it was *not* possible to follow or use the typing technique used with conventional keyboards or typewriters. Stated another way, a virtual keyboard embodying such a conventional pressure-sensitive panel cannot be operated or function in the same way as a conventional keyboard (i.e., cannot depress the shift key and while keeping the shift key depressed also depress the letter, number or punctuation key at the same time so as to output a capitalized letter or a punctuation mark residing in the upper case mode).

(3.) The Declaration (see paragraphs 14-20 thereof) also clearly indicates that whatever the discussion being referred to in column 1 of Ouellette was intended to convey, it *cannot* mean that one could use a conventional typing technique when pushing the keys of a virtual keyboard embodying a conventional pressure-sensitive panel. Stated another way, and contrary to the apparent inference being drawn in the Office Action, a virtual keyboard embodying a conventional pressure-sensitive panel *cannot* be operated or *cannot* function in the same way as a conventional keyboard.

(4.) As also indicated above, Dunthorn also states that a single position is returned when a resistive touch screen or pad is touched in two places at the same time. See column 4, lines 4-10.

Applicant also refers to the further comments provided above directed to the assertions contained in the Second Final Office Action specifically directed to the submitted Declaration.

As to the assertions in the Office Action to the supposed teachings of Dunthorn, Applicant makes the following observations. Dunthorn nowhere describes, teaches or suggests a process for determining the position or coordinates of a second button in the manner as set forth in the claims of the present invention. The invention in Dunthorn is directed to apparatus and methods for creating a virtual push button.

In one case, Dunthorn (see col. 4, lines 11-24 thereof), describes a process whereby a virtual push button is created by the sudden large change or discontinuity in reported position when the screen or pad is touched at one point and then touched at another point as well. It is further provided that the action of touching the screen/ pad at a second touch point without first releasing a still active first touch point thereby creates one form of a virtual push-button.

It is further described in Dunthorn (see col. 4, lines 58-68 thereof) that a virtual push button is not fixed to any position on the screen, but is defined at a position related to the position of two simultaneous touch actions giving rise to the virtual push-button. Thus, it is indicated that virtual push-buttons may coexist with and even overlie actual push button locations without creating any interference with the functions normally assigned to those actual push button locations.

Dunthorn does indicate (see col. 6, lines 34-47) that the first touch may occur at a location of an actual button. The discussion that follows (col. 6, lines 48-55) clearly indicates that the second touch does not occur at a second button, rather it provides that if before the forefinger is removed from the location 22 of the first touch, the user's thumb is brought into contact with the screen 16 at location 24, a virtual push button at location 26 is thereby established, and this virtual push button may operate to do any of a number of things including

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for example canceling the function originally called up by depressing the location 22 of the touch screen.

In sum, Dunthorn describes and teaches a process for creating virtual push buttons by touching the screen/ pad in two places at the same time. Dunthorn does not describe, teach or suggest that the second touch occurs at another key or button. Also, Dunthorn does not disclose teach or suggest determining the location or coordinates of where the second touch occurs. In fact, the location or coordinates of the second touch area is totally irrelevant with regards to the operation and purpose of the invention disclosed in Dunthorn. As indicated above, in the invention of Dunthorn touching two areas of a screen simultaneously is used to create a virtual push-button, which virtual push button in turn can cause some action or further operation such as aborting or canceling operations.

As such, Dunthorn does not describe, teach or suggest first touching or pushing a special key, thereafter pushing both a special key and a general key and using the position information obtained, including the middle position between the two touched keys to determine the location/ position/ coordinates of the second pushed key. Furthermore, if the teachings of Dunthorn where combined with the virtual keyboard as disclosed in Ouellette, the result still would not yield the invention claimed by Applicant as the combination would only yield a virtual keyboard capable of creating virtual push buttons that can be used, *inter alia*, to cancel or abort functionalities.

It thus appears that in the present case, the Examiner is combining various and selective teachings of the two cited references, not based on any disclosure, teaching or suggestion provided in the references themselves, but rather is searching for disclosure and teachings based on what is taught and disclosed by Applicant and then is using such disclosure/ teachings to

assert that the claims of the present invention are not patentable over such disclosure/ teaching. Stated another way, the Examiner is making a hindsight reconstruction of selected teachings from the two cited references in view of Applicant's disclosure and has not provided an evidentiary basis as to why one skilled in the art would have been motivated by these references to make such a combination. For example, neither of the two cited references anywhere point to the problem sought to be overcome by the present invention.

In addition, the Examiner has not provided an evidentiary basis to refute the evidence offered by Applicant in the form of the Declaration in the Appendix, Tab C. The evidence offered by Applicant clearly establishes that the language referred to by the Examiner in col. 1 of Ouellette does not and cannot mean that the position or coordinates of a general key can be determined from position information obtained from a pressure-sensitive panel when both a special and general key are pushed at the same time.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As provided above, the references cited, alone or in combination, include no such teaching, suggestion or motivation.

Furthermore, and as provided in MPEP 2143.02, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 19866). Additionally, it also has

been held that if the proposed modification or combination would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. As can be seen from the forgoing discussion regarding the disclosures of the cited references, there is no reasonable expectation of success provided in any of the prior art references. Also, it is clear from the foregoing discussion that the modification suggested by the Examiner would change the principle of operation of the device disclosed in Ouellette.

The Federal Circuit also has indicated that a prior art reference that gives only general guidance and is not all that specific as to particular forms of a claimed invention and how to achieve it, may make a certain approach obvious to try, but does not make the invention obvious. *Ex Parte Obukowicz*, 27 USPQ2d 1063, citing *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673,1681 (Fed. Cir. 1988).

As the Federal circuit has stated, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260,1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. *Para-Ordance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.2d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995). It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed.Cir.1983).

As the Federal Circuit also has recently stated in *In re SANG-SU LEE*, 271 F.3d 1338, 1342-1344; 277 USPQ 2d 1430 (Fed. Cir. 2002) (copy provided herewith in the Appendix, Tab D):

> As applied to the determination of patentability *vel non* when the issue is obviousness, "it is fundamental that rejections under 35 U.S.C. §103 must be based on evidence comprehended by the language of that section." *In re Grasselli,* 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed.Cir.1983). The essential factual evidence on the issue of obviousness is set forth in *Graham v. John Deere Co.,* 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966) and extensive ensuing precedent. The patent examination process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. *See, e.g., McGinley v. Franklin Sports, Inc.,* 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed.Cir.2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the *Graham* factors).
>
> "The factual inquiry whether to combine references must be thorough and searching." *Id.* It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. *See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc.,* 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed.Cir.2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding' ") (quoting *C.R. Bard, Inc., v. M3 Systems, Inc.,* 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed.Cir.1998)); *In re Dembiczak,* 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed.Cir.1999) ("Our case law makes clear that the best defense against the

subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); *In re Dance,* 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed.Cir.1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); *In re Fine,* 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed.Cir.1988) (" 'teachings of references can be combined *only* if there is some suggestion or incentive to do so.' ") (emphasis in original) (quoting *ACS Hosp. Sys., Inc. v. Montefiore Hosp.,* 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed.Cir.1984)).

The need for specificity pervades this authority. *See, e.g., In re Kotzab,* 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed.Cir.2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); *In re Rouffet,* 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed.Cir.1998) ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); *In re Fritch,* 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed.Cir.1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references").

It is respectfully submitted that for the foregoing reasons there is no teaching, nor is there any motivation or desire offered in Ouellette and Dunthorn, alone or in combination, that would suggest to one skilled in the art to reconfigure the virtual keyboard disclosed therein so as to yield the virtual keyboard claimed by Applicant. Thus, for the foregoing reasons claims 2, 3, 5-18, 20, 22 and 24 are patentable over the cited combination of references.

THIRD ISSUE

CLAIM 19 IS NOT OBVIOUS WITHIN THE MEANING OF 35 U.S.C. §103 BY OUELLETTE ET AL. [USP 5,581,243; "OUELLETTE"] AND FURTHER IN VIEW OF YOSHIKAWA [USP 5,392,035]

For purposes of the present appeal, the obviousness rejection of claim 19 is deemed addressed in the above discussion concerning claim 1. Applicants adopt here the arguments set forth concerning claim 1. Thus, for this reason claim 19 is patentable over the cited reference.

FOURTH ISSUE

CLAIMS 21, 23 AND 25 ARE NOT OBVIOUS WITHIN THE MEANING OF 35 U.S.C. §103 BY OUELLETTE ET AL. [USP 5,581,243; "OUELLETTE"] IN VIEW OF DUNTHORN [USP 4,914,624] AND FURTHER IN VIEW OF YOSHIKAWA [USP 5,392,035]

For purposes of the present appeal, the obviousness rejection of claim 21 is deemed addressed in the above discussion concerning claim 7. Applicants adopt here the arguments set forth concerning claim 7. Thus, for this reason claim 21 is patentable over the cited reference.

For purposes of the present appeal, the obviousness rejection of claim 23 is deemed addressed in the above discussion concerning claim 11. Applicants adopt here the arguments set forth concerning claim 11. Thus, for this reason claim 23 is patentable over the cited reference.

For purposes of the present appeal, the obviousness rejection of claim 25 is deemed addressed in the above discussion concerning claim 14. Applicants adopt here the arguments set forth concerning claim 14. Thus, for this reason claim 25 is patentable over the cited reference.

FIFTH ISSUE

CLAIM 19 IS NOT OBVIOUS WITHIN THE MEANING OF 35 U.S.C. §103 BY OUELLETTE ET AL. [USP 5,581,243; "OUELLETTE"] AND FURTHER IN VIEW OF APPLICANT'S ADMITTED PRIOR ART ["AAPA"]

For purposes of the present appeal, the obviousness rejection of claim 19 is deemed addressed in the above discussion concerning claim 1. Applicants adopt here the arguments set forth concerning claim 1. Thus, for this reason claim 19 is patentable over the cited reference.

SIXTH ISSUE

CLAIMS 21, 23 AND 25 ARE NOT OBVIOUS WITHIN THE MEANING OF 35 U.S.C. §103 BY OUELLETTE ET AL. [USP 5,581,243; "OUELLETTE"] IN VIEW OF DUNTHORN [USP 4,914,624] AND FURTHER IN VIEW OF APPLICANT'S ADMITTED PRIOR ART ["AAPA"]

For purposes of the present appeal, the obviousness rejection of claim 21 is deemed addressed in the above discussion concerning claim 7. Applicants adopt here the arguments set forth concerning claim 7. Thus, for this reason claim 21 is patentable over the cited reference.

For purposes of the present appeal, the obviousness rejection of claim 23 is deemed addressed in the above discussion concerning claim 4. Applicants adopt here the arguments set forth concerning claim 11. Thus, for this reason claim 23 is patentable over the cited reference.

For purposes of the present appeal, the obviousness rejection of claim 25 is deemed addressed in the above discussion concerning claim 14. Applicants adopt here the arguments set forth concerning claim 14. Thus, for this reason claim 25 is patentable over the cited reference.

Respectfully submitted,
EDWARDS & ANGELL, LLP

Date: February 4, 2004

By: _____
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Bos2 432687.1

Practitioner's Docket No. 47958 CPA (71117)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Nakagawa
Application No.:   09/006,363
Filed: January 13, 1998
For: VIRTUAL KEYBOARD

Confirmation: 3646
Group No.: 2673
Examiner: Nguyen, Jimmy H.

RECEIVED

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF (PATENT APPLICATION--37 C.F.R. SECTION 1.192)

1. Transmitted herewith, in triplicate, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on August 4, 2003.

NOTE: *"Appellant must, within two months from the date of the notice of appeal under section 1.191 or within the time allowed for reply to the action from which the appeal was taken, if such time is later, file a brief in triplicate....." 37 C.F.R. Section 1.192(a) (emphasis added)*

2. STATUS OF APPLICANT

    This application is on behalf of

CERTIFICATE OF MAILING/TRANSMISSION (37 C.F.R. SECTION 1.8(a))

I hereby certify that, on the date shown below, this correspondence is being:

MAILING	FACSIMILE
[x] deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Mail Stop: Appeal 'Brief – Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.	[ ] transmitted by facsimile to the Patent and Trademark Office (703) ____-____.

Date: February 4, 2004

William J. Daley, Jr.
(type or print name of person certifying)

(Transmittal of Appeal Brief--page 1 of 4)

[X] other than a small entity.
[ ] a small entity.

A statement:

[ ] is attached.
[ ] was already filed.

3. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. Section 1.17(c), the fee for filing the Appeal Brief is:

[ ] small entity $165.00

[X] other than a small entity $330.00

Appeal Brief fee due $ 330.00

4. EXTENSION OF TERM

NOTE: *The time periods set forth in 37 C.F.R. 1.192(a) are subject to the provision of Section 1.136 for patent applications. 37 C.F.R. 1.191(d). See also Notice of November 5, 1985 (1060 O.G. 27).*

NOTE: *As the two-month period set in Section 1.192(a) for filing an appeal brief is not subject to the six-month maximum period specified in 35 U.S.C. 133, the period for filing an appeal brief may be extended up to seven months. 62 Fed. Reg. 53,131, at 53,156; 1203 O.G. 63 at 84. Oct. 10, 1997.*

The proceedings herein are for a patent application and the provisions of 37 C.F.R. Section 1.136 apply.

(complete (a) or (b), as applicable)

(a) [X] Applicant petitions for an extension of time under 37 C.F.R. Section 1.136 (fees: 37 C.F.R. Section 1.17(a)(1)-(5)) for the total number of months checked below:

[ ]	Extension (months)small entity	Fee for other than	Fee for small entity
[ ]	one month	$110.00	$ 55.00
[ ]	two months	$420.00	$210.00
[ ]	three months	$950.00	$475.00
[X]	four months	$1,480.00	$740.00
[ ]	five months	$2,010.00	$1,005.00

Fee $ 1,480.00

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

[ ] An extension for ____ month(s) has already been secured, and the fee paid therefor of $_____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request $ 1,480.00

or

(b) [ ] Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal brief fee $ 330.00
Extension fee (if any) $ 1,480.00

TOTAL FEE DUE $ 1,810.00

6. FEE PAYMENT

[X] Attached is a check in the sum of $ 1,810.00.
[ ] Charge Account No. _____the sum of $_____.

7. FEE DEFICIENCY

NOTE: If there is a fee deficiency and there is no authorization to charge an account additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in resuming the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to change the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G 31-33.

[X] If any additional extension and/or fee is required, this is a request therefor and to charge Account No. 04-1105.

AND/OR

[X] If any additional fee for claims is required, charge Account No. 04-1105.

February 4, 2004
DATE

Reg. No. 35,487

Tel. No. (617) 439-4444

Customer No. 21874

SIGNATURE OF PRACTITIONER

William J. Daley, Jr.
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(Transmittal of Appeal Brief--page 4 of 4)

APPENDIX

Bos2 432770.1

APPENDIX A

1.   A virtual keyboard comprising:

a display for displaying a keyboard;

a transparent pressure-sensitive panel disposed on the display; and

a processor for receiving information of positions detected and sent in a time sequence from the pressure sensitive panel when a special key is first pushed and thereafter when both of the special key and a general key are pushed at the same time, identifying a position of the pushed general key according to the received position information and outputting a code corresponding to the combination of the pushed special key and the general key corresponding to the identified position.

2.   A virtual keyboard as defined in claim 1, wherein one of the received position information, when both of the special key and the general key are pushed at the same time, is a furthest returning position from the special key and wherein the position of the general key is determined by doubling a distance between a start position and the furthest returning position.

3.   A virtual keyboard as defined in claim 1, wherein a distance between a position of the first pushed key and a furthest returning position, when both of the special key and the general key are pushed at the same time, that are of the information of positions detected in a time sequence is doubled to identify the position of the general key.

4.   (AMENDED) A virtual keyboard comprising:

a display that displays a keyboard;

a transparent pressure-sensitive panel disposed on the display; and

a processor that receives information of positions detected and sent in a time

sequence from the pressure sensitive panel when a special key is first pushed and

thereafter when both of the special key and a general key are pushed at the same

time, that identifies the pushed general key by determining a position of the pushed

general key according to the received position information of the first pushed key and

the pushed combination of the special key and the general key and that outputs a

code corresponding to the combination of the pushed special key and the identified

general key.

5.   A virtual keyboard as defined in claim 4, wherein:

one of the received position information, when both of the special key and the

general key are pushed at the same time, is a furthest returning position from the

special key in the information of positions detected in a time sequence, and

the position of the general key is determined by doubling a distance between a

start position and the furthest position.

6.   A virtual keyboard as defined in claim 4, wherein a distance between a

position of the first pushed key and a furthest returning position, when both of the

special key and the general key are pushed at the same time, that are of the

information of positions detected in a time sequence is doubled to identify the position

of the general key.

7. (AMENDED) A virtual keyboard comprising:

a display for displaying a keyboard;

a transparent pressure-sensitive panel disposed on the display; and

a processor;

wherein the processor is configured and arranged:

(1) to receive information of positions detected and sent in a time sequence from the pressure sensitive panel, the position information provided including when a special key is first pushed and thereafter when both of the special key and one of a plurality of general keys are pushed at the same time,

(2) to determine a target position using the received position information of when the special key is pushed and when both of the special key and said one general key are pushed, and

(3) to determine which of the plurality of general keys corresponds to the determined target position.

8. The virtual keyboard of claim 7 wherein the processor is further configured and arranged to output a code corresponding to the combination of the pushed special key and the determined general key.

9. The virtual keyboard of claim 7, wherein to determine the target position the processor is configured and arranged to determine the position of the pushed special key, to determine a furthest returning position using the position information detected and sent in a time sequence when both the special key and the general key

A-3

are pushed, and to calculate a distance between the special key and the furthest returning position.

10. The virtual keyboard of claim 9, wherein to determine the target position the processor is further configured and arranged to calculate a position using the determined position of the pushed special key and doubling the calculated distance between the special key and furthest returning position.

11. A virtual keyboard comprising:

a display for displaying a keyboard;

a transparent pressure-sensitive panel disposed on the display; and

a processor;

wherein the processor is configured and arranged to:

(1) receive information of positions detected and sent in a time sequence from the pressure sensitive panel, the position information provided including when a special key is first pushed and thereafter when both of the special key and one of a plurality of general keys are pushed at the same time,

(2) determine a target position using the received position information of when the special key is pushed and when both of the special key and said one general key are pushed, including to determine the position of the pushed special key, to determine a furthest returning position using the position information detected and sent in a time sequence when both the special key and the general key are pushed, and to calculate a distance between the special key and the furthest returning position,

A-4

(3) determine which of the plurality of general keys corresponds to the determined target position, and

(4) output a code corresponding to the combination of the pushed special key and the determined general key.

12. The virtual keyboard of claim 11, wherein to determine the target position the processor is further configured and arranged to calculate the target position using the determined position of the pushed special key and doubling the calculated distance between the special key and furthest returning position.

13. The virtual keyboard of claim 12, wherein the detected positions in a time sequence are established using a coordinate system, and wherein the position being calculated is calculated using each of coordinate position(s) of the pushed special key and doubling a calculated distance for each coordinate axis of the coordinate system, the calculated distance being representative of the distance between the special key and the furthest returning position.

14. A method for determining one of a plurality of general keys of a virtual keyboard being pushed in combination with a special key being pushed at the same time, comprising the steps of:

pushing the special key;

pushing both of the special key and the one of the plurality of general keys;

releasing both of the special key and one of the plurality of general keys;

detecting positions in a time sequence from a pressure sensitive panel of the virtual keyboard, the detected positions including when the special key is first pushed and thereafter when both of the special key and the one of the plurality of general keys are pushed at the same time,

determining a target position using the detected positions of when the special key is pushed and when both of the special key and the one of the plurality of general keys are pushed, and

determining which of the plurality of general keys corresponds to the determined target position.

15. The method of claim 14, further including the step of outputting a code corresponding to the combination of the pushed special key and the determined general key.

16. The method of claim 14, wherein said determining the target position includes:

determining a position of the pushed special key when only the special key is being pushed;

determining a furthest returning position using the detected position information when both the special key and the one of the plurality of general keys are pushed at the same time; and

calculating a distance between the special key and the furthest returning position.

17.   The method of claim 16, wherein said determining the target position further includes calculating a target position using the determined position of the pushed special key and doubling the calculated distance between the special key and furthest returning position.

18.   The virtual keyboard of claim 1, wherein the transparent pressure-sensitive panel is of a type where a position in each of the x and y directions is determined using a divided resistance technique.

19.   The virtual keyboard of claim 1, wherein the transparent pressure-sensitive panel includes:

a plurality of resistance wires being arranged to extend in a first direction;

a plurality of resistance wires being arranged to extend in a second direction, the first and second directions being at an angle with respect to each other; and

two pairs of electrodes where the plurality of resistance wires in the first direction extend between and are electrically coupled to one of the pair of electrodes and the plurality of resistance wires in the second direction extend between and are electrically coupled to the other of the pair of electrodes.

20.   The virtual keyboard of claim 7, wherein the transparent pressure-sensitive panel is of a type where a position in each of the x and y directions is determined using a divided resistance technique.

21.   The virtual keyboard of claim 7, wherein the transparent pressure-sensitive panel includes:

a plurality of resistance wires being arranged to extend in a first direction;

a plurality of resistance wires being arranged to extend in a second direction, the first and second directions being at an angle with respect to each other; and

two pairs of electrodes where the plurality of resistance wires in the first direction extend between and are electrically coupled to one of the pair of electrodes and the plurality of resistance wires in the second direction extend between and are electrically coupled to the other of the pair of electrodes.

22.   The virtual keyboard of claim 11, wherein the transparent pressure-sensitive panel is of a type where a position in each of the x and y directions is determined using a divided resistance technique.

23.   The virtual keyboard of claim 11, wherein the transparent pressure-sensitive panel includes:

a plurality of resistance wires being arranged to extend in a first direction;

a plurality of resistance wires being arranged to extend in a second direction, the first and second directions being at an angle with respect to each other; and

two pairs of electrodes where the plurality of resistance wires in the first direction extend between and are electrically coupled to one of the pair of electrodes and the plurality of resistance wires in the second direction extend between and are electrically coupled to the other of the pair of electrodes.

24.   The method of claim 14, wherein each of the positions detected and sent in a time sequence from the pressure-sensitive panel is detected using a divided resistance technique.

25.   The virtual keyboard of claim 14, wherein the pressure-sensitive panel includes:

a plurality of resistance wires being arranged to extend in a first direction;

a plurality of resistance wires being arranged to extend in a second direction, the first and second directions being at an angle with respect to each other; and

two pairs of electrodes where the plurality of resistance wires in the first direction extend between and are electrically coupled to one of the pair of electrodes and the plurality of resistance wires in the second direction extend between and are electrically coupled to the other of the pair of electrodes.

Explanation of how one can determine the furthest returning position without knowing the position of the general key.

Suppose that three of the keys comprising the keyboard are defined as follows;

Suppose that the area or locus of "Shift" key is in a rectangle with the 4 apexes at the following coordinates: $(X,Y)=(5,5),(15,5),(15,15),(5,15)$.

Suppose that the area or locus of "x" key (a lower case key) is in a rectangle with the 4 apexes at the following coordinates: $(X,Y)=(25,5),(35,5),(35,15),(25,15)$.

Suppose that the area or locus of "r" key (a lower case key) is in a rectangle with the 4 apexes at the following coordinates: $(X,Y)=(45,45),(55,45),(55,55),(45,55)$.

SINGLE KEY PRESSED

Now suppose that only the "x" key is depressed or pushed. From the attached Tabulation of Detected Positions and Distance from Starting Position for trace A, it can be seen that all positions are located in the area of the "x" key. Thus, the processor generates the character "x" the lower case alphabetic character.

For purposes of illustration Figure aa attached hereto shows the loci of the "x" key and the detected coordinate positions for each of the time sequenced detected points on the within Tabulation.

TWO KEYS PRESSED

Now for the case when both the "Shift" and "r" keys are to be depressed. From the attached Tabulation of Detected Positions and Distance from Starting Position for trace B, it can be seen that the starting position and the end position are located in the area of Shift key.

As also shown in the tabulation, a distance from the starting point is calculated for every detected point for each time interval. The processor compares each calculated distance and then determines the detected position (i.e., X,Y coordinates) that corresponds to the furthest position from the starting position. In the case of the illustrative example, the furthest calculated distance is 28.8 units corresponding to time = 1.7 sec. and also corresponding to X,Y coordinates of 30,30. These coordinates also correspond to the furthest returning position.

The processor then calculates the X,Y coordinates of the target position by means of the following relationships

$$X_T = X_{sp} + 2 \ (X_{fp} - X_{sp})$$

$$Y_T = Y_{sp} + 2 \ (Y_{fp} - Y_{sp})$$

where:

X_T: is the x coordinate of the target position

X_{sp}: is the x coordinate of the starting position

X_{fp}: is the x coordinate of the furthest returning position

Y_T: is the y coordinate of the target position

Y_{sp}: is the y coordinate of the starting position

Y_{fp}: is the y coordinate of the furthest returning position

Inputting the x and y coordinates from the attached tabulation corresponding to the starting position and the furthest returning position into the above, results in the following (also would be calculated by the processor):

$X_T=10+2*(30-10)=2*30-10=50$

$Y_T=10+2*(30-10)=2*30-10=50$.

Thus, the processor would find that the target position is $(X,Y)=(50,50)$. This is within the area bounded by the "r" key. With this simple scheme, a person can determine the furthest returning position (30,30) without the position of the general key. Furthermore one can determine that the secondly pushed position is (50,50).

Because it is determined that both the shift key and the "r" key were depressed at the same time, the processor generates the character "R"(upper case letter).

For purposes of illustration Figure bb attached hereto shows the loci of the "Shift" key, the "r" key and the detected coordinate positions for each of the time sequenced detected points provided on the Tabulation

Tabulation of Detected Positions and Distance from Starting Position

Time (sec.)	X Coordinate	Y Coordinate	Distance from starting position	Explain	Name
0.1	Not detected	Not detected	-		
0.2	Not detected	Not detected	-		
0.3	Not detected	Not detected	-		
0.4	30	10	0	Starting position	Trace A
0.5	32	10	2		Trace A
0.6	31	11	1.4		Trace A
0.7	30	9	1		Trace A
0.8	Not detected	Not detected	-		
0.9	Not detected	Not detected	-		
1.0	Not detected	Not detected	-		
1.1	Not detected	Not detected	-		
1.2	Not detected	Not detected	-		
1.3	10	10	0	Starting position	Trace B
1.4	10	11	1		Trace B
1.5	9	10	1		Trace B
1.6	30	29	27.6		Trace B
1.7	30	30	~~28.8~~ **28.3**	Furthest Returning Position	Trace B
1.8	29	30	27.6		Trace B
1.9	11	9	1.4		Trace B
2.0	10	11	1		Trace B
2.1	Not detected	Not detected	-		
2.2	Not detected	Not detected	-		

$$Dsp = \sqrt{\Delta X^2 + \Delta Y^2}$$

where ΔX and ΔY are determined as follows

$$\Delta X = Xip - Xsp$$

$$\Delta Y = Yip - Ysp$$

and where

Dsp is the distance from the starting position

Xip is an X coordinate for one of the times a measurement is to be made (e.g., 1.7 seconds)

Xsp is the X coordinate of the starting position

Yip is the Y coordinate for the same time as when Xip is determined

Ysp is the Y coordinate of the starting position

For example, the distance from the starting point at the time of $T = 1.7$ seconds is determined as follows:

$$Dsp = \sqrt{(30\text{-}10)^2 + (30\text{-}10)^2}$$

$$Dsp = \sqrt{20^2 + 20^2}$$

$$Dsp = 28.3$$

Figure aa

⊙ starting position
× other detected positions

loci of "X" key

⊙ – starting Position
⊗ – furthest position
▣ – target position
× – other detected positions

loci of "r" key

loci of shit key

D58

Figure 1

10
20
30
40
50
60

FIG.1

Y-DIRECTION

X-DIRECTION

11

10

11

FIG.2A

V_0

Ry1

20

Rx1   Rx2

Ry2

OUT

FIG.2B

V_0

Ry1

20

Rx1   Rx2

Ry2

OUT

FIG.3

FIG.4

ENLARGEMENT

COMPUTING
PORTION — 4
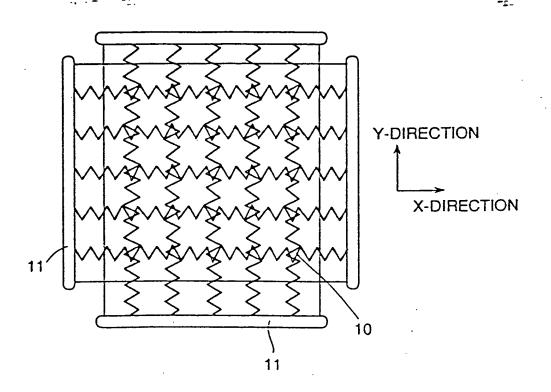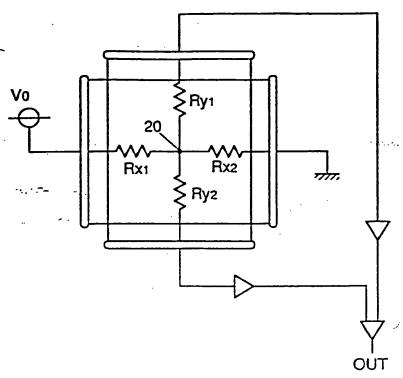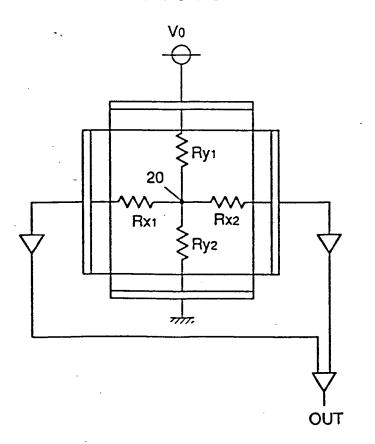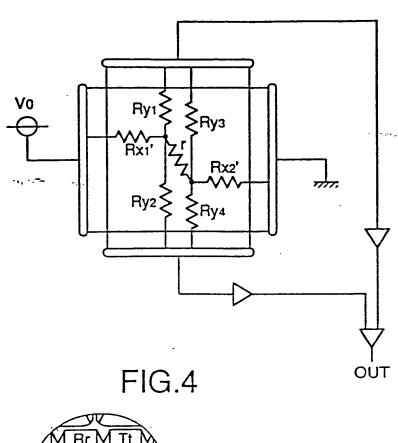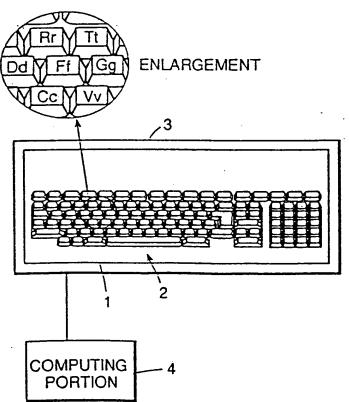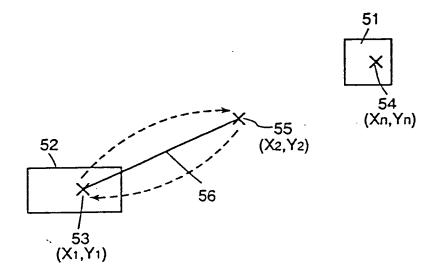
FIG.5

Attorney Docket No. 47,958-CPA (71117)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Katsuya Nakagawa   EXAMINER: Nguyen, J.

SERIAL NO.: 09/006,363   GROUP: 2673

FILED: January 13, 1998

FOR: VIRTUAL KEYBOARD

Assistant Commissioner for Patents
Washington, D.C. 20231

■■■

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231 on November 21, 1999.

By: _William J. Daley_
William J. Daley, Jr.

■■■

DECLARATION UNDER RULE 132

Sir:

I, Katsuya Nakagawa, declare as follows:

1. I am the sole inventor of the subject matter described and claimed in the patent application U.S.S.N. 09/006,363, filed on January 13, 1998 and otherwise identified above.

2. This declaration is being submitted to address certain incorrect conclusions reached by the Examiner as to the teachings and disclosure of the principal reference cited by the Examiner [Ouellette et al., USP 5,581,243, "Ouellette"] as well as to correctly describe the operation and limitations of a transparent pressure sensitive panel as included in the claims of the present invention.

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RULE 132 DECLARATION
Page 2

3. Before discussing the references, it is first necessary to understand the operations and limitations of a transparent pressure sensitive panel as described in the present invention and as is known to those skilled in the art.

4. There is shown in annotated FIG. 1 (see Appendix, Tab A) a structure of a pressure sensitive panel that includes several hundreds to several thousands of fine wires 10 that are arranged along the x-axis and y-axis respectively. The panel also includes two (2) pair of electrodes 11; one pair of electrodes is connected to the fine wires 10 extending in the x- direction and the other pair of electrodes is connected to the fine wires 10 that extend in the y-direction.

5. As described in the subject application on page 5 thereof, when pressures is applied to single area or point 20 of a pressure sensitive panel, two resistance wires, one in the x-direction and one in the y-direction contact each other and conduct at this point 20, as more clearly shown in FIG. 2A (see Appendix, Tab B).

6. As shown in annotated FIG. 2A, a voltage is applied across the terminal electrode pair 11 for the wire extending in the x-direction and a first output is obtained across the terminal electrode pair for the wire that extends in the y-direction. This first output value, corresponding to a divided resistance, is amplified to determine a position of the point along the x-axis or in the x-axis direction. Similarly, and as shown in annotated FIG. 2B (see Appendix, Tab B), a voltage is applied across the terminal electrode pair 11 for the wire extending in the y-direction and a second output is obtained across the terminal electrode pair for the wire that extends in the x-direction. This second output value, also corresponding to a divided resistance, is amplified to determine a position of the point along the y-axis or in the y-axis direction. In sum, the foregoing describes a process by which the x, y coordinates are determined for a position on the pressure-sensitive panel at which pressure is being applied. Stated another way, the foregoing describes a process by which the x, y coordinates for determining where the pressure-sensitive panel is being touched.

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7. Because all of the wires extending in the x-direction are all electrically connected to the one terminal electrode pair and because all of the wires extending in the y-direction are all electrically connected to another terminal electrode pair, if pressure is applied to more than one point on the pressure sensitive panel, for example two points, one **cannot** determine the x, y coordinate corresponding to each point where pressure is being applied. This is so because in a pressure-sensitive panel the output is across the *terminal electrode pair* **not** across the *individual wires* connected to the electrode terminal pair.

8. Thus, when pressure is applied to more than one point on the pressure-sensitive panel at the same time, only one output is provided for the x-direction and only another output is provided for the y-direction. There cannot be outputted an x, y coordinate output that corresponds to one area where pressure is being applied and a second x, y coordinate output that corresponds to one area where pressure is being applied. This is precluded by the electrical arrangement of the pressure-sensitive panel as illustrated in FIG. 3 of the subject application (see Appendix Tab C). This also is consistent with Dunthorn that teaches and discloses that some point other than the areas being pushed is determined.

9. In contrast, for a conventional keyboard, each key is uniquely identifiable because an output unique to each key is outputted when the key is depressed or otherwise actuated.

10. In a conventional keyboard, the shift key is utilized to alternate between the lower case and the upper case functionalities. Thus to print out a capital A, a typist or user depresses the shift key and while the shift key remains depressed the "A" letter key also is depressed. Similarly, if one wants to type an exclamation point ("!"), the typist depresses the shift key and while the shift key remains depressed the "1" number key also is depressed. After either the capital A or the exclamation point is

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Page 4

printed, depicted on the screen or typed on the paper, the typist releases the letter/
number key and the shift key assuming that no more capital letters for example are to
be typed.

10. As indicated above in paragraphs 7-8, it is **not** possible to separately
determine the locations of each point where pressure is being applied on a pressure-
sensitive panel if this pressure is being applied to more than one area at the same
time. Thus and as described in the subject application, when using a pressure
sensitive panel a typist **cannot** use or follow the procedure one would use with a
conventional keyboard. Instead, another procedure has been developed for use with
conventional pressure-sensitive panels such as of the type shown in FIG. 1 of the
subject application.

11. In this other procedure, the typist first applies pressure to the area of the
panel corresponding to the location of the shift key so as to change the input mode to
the capitalization input mode. The typist then releases the shift key and then applies
pressure to the area of the panel corresponding to the location of the desired capital
letter/ punctuation mark key to be stricken. After the desired capital letter/
punctuation mark is outputted, the typist then stops applying pressure to the area of
the capital letter/ punctuation mark key. Assuming that the capitalization input
mode is no longer required, the typist again applies pressure to the area of the panel
corresponding to the location of the shift key so as to release the capitalization input
mode.

12. Because only one area of the pressure-sensitive panel is being pressed at a
time in this technique, the x, y coordinates corresponding to the area being touched or
pushed can be determined in the fashion described above and as described the subject
application (e.g., see FIGS. 2A,B thereof).

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13. It should be recognized that the foregoing is essentially the same procedure described in the principal reference cited in connection with the prosecution of the Ouellette patent, namely Auer at al. [USP 4,725,694, "Auer"] a copy of which is provided in Appendix Tab D. See for example, FIG. 7 of Auer and the discussion at col. 5, lines 1-20. See also Dunthorn [USP 4,914,624], col. 1, lines 10-55.

14. There is described in column 5, lines 4-32 of Ouellette a process for determining a *touch* on the touch screen 24. Therein it is provided that each touch is defined by a five-character coordinate set. It also is provided that by establishing a voltage divider circuit, the *touch* produces voltage signals detectable by the touch screen controller 18 which are representative of the average Cartesian coordinates in the x- and y-directions of the *touched area* of the screen.

15. There is **no** discussion in these lines of column 5 that more than one area of the screen is or can be being touched at the same time. It is clear that this discussion describes a process where coordinates are determined for the area being touched and nothing more. In sum, column 5 nowhere describes a technique in which coordinates are and can be determined if more than one area on the screen is being touched at the same time.

16. Reference also is made to the discussion in column 1, lines 51-63 of Ouellette, that is a part of the discussion of the Background of the invention.

17. It should first be noted that this discussion in Ouellette does not provide or state that a virtual pressure-sensitive keyboard functions the same way as a conventional keyboard. It also does not state or provide that a typist would use the same typing technique as a conventional keyboard as when using virtual pressure-sensitive keyboard.

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18. It appears that such a conclusion is being inferred because the language provides that the user would touch the touch sensitive-panel on the displayed keys in the same fashion that a typist uses a conventional typewriter and because of the parenthetical which provides capital or lower case letters depending on whether the displayed shift key is touched.

19. Whatever this discussion in Ouellette was intended to convey or describe, it was not and could not have meant that a user would touch the touch sensitive panel on two displayed keys, one being the shift key, at the same time so as to generate for example a capital letter. As indicated in the discussion above in paragraphs 4-12, at the time the application maturing into the Ouellette patent was filed, a touch sensitive panel was limited by its construction so it could be used to only determine the x-, y- coordinates of an area being touched. If more than one area were touched at the same time, the position being determined would not correspond to either of the areas being touched. See also paragraphs 7-8 above.

20. Thus, and contrary to the inference and conclusion being drawn in the Office Action, a virtual keyboard including a touch or pressure sensitive panel **cannot** function the same way as a conventional keyboard.

I, the undersigned Katsuya Nakagawa, declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and

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U.S.S.N.: 09/006,363
RULE 132 DECLARATION
Page 7

that such willful false statements may jeopardize the validity of this application or any
patent issuing thereon.

November _9_, 2001

Katsuya Nakagawa
Katsuya Nakagawa
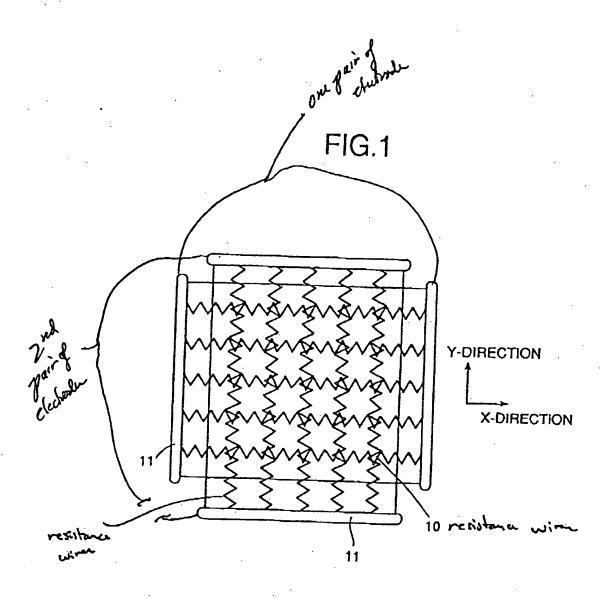
Bos2 #179794.1

APPENDIX

Tab A   Annotated FIG. 1 from USSN 09/006,363

Tab B   Annotated FIGS. 2A,B from USSN 09/006,363

Tab C   Annotated FIG. 1 from USSN 09/006,363

Tab D   USP 4,725,694

A

"A"

one pair of electrode

FIG.1

2nd pair of electrode

11

resistance wire

Y-DIRECTION

X-DIRECTION

10 resistance wire

11

B

"B"

FIG.2A

FIG.2B

C

"C"

FIG.3

Y- resistance wire

X electrode

X₁ resistance wire

X electrode

V0

point #2

Ry1　Ry3

Rx1'　r

Rx2'

X electrode

Ry2　Ry4

X₂ resistance wire

point #1

Y electrode

OUT

FIG.4

| Rr | Tt |
| Dd | Ff | Gg | ENLARGEMENT
| Cc | Vv |

COMPUTING
PORTION — 4

D
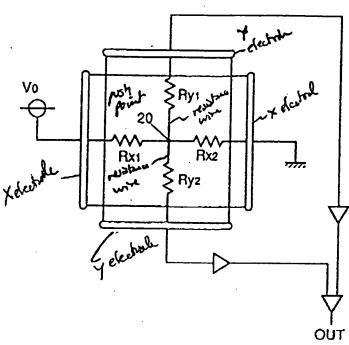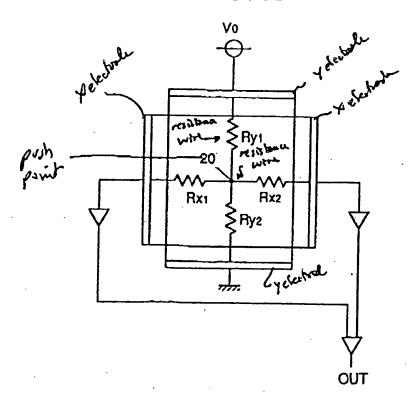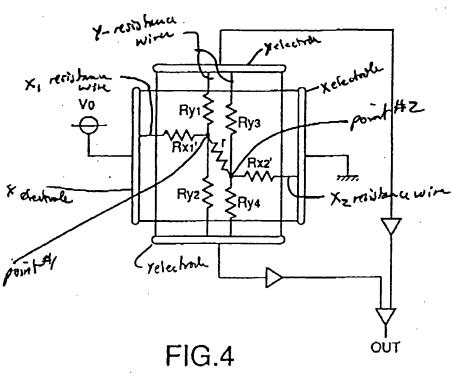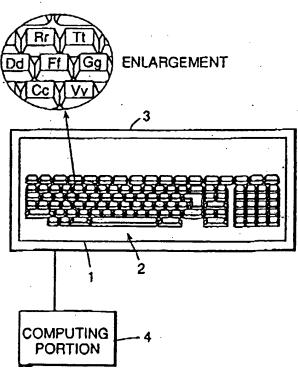
United States Patent [19]

Auer et al.

[11] Patent Number: 4,725,694

[45] Date of Patent: Feb. 16, 1988

[54] COMPUTER INTERFACE DEVICE

[75] Inventors: Carol M. Auer, Middletown, N.J.; Daniel L. Castagno, Pickerington; Allen W. Haley, Jr., Columbus, both of Ohio; Harry H. Moore, IV, Lincroft, N.J.; Sean E. O'Leary, Eatontown, N.J.; Steven J. Paley, Aberdeen, N.J.; Thomas E. Rutt, Asbury Park, N.J.

[73] Assignee: American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

[21] Appl. No.: 862,629

[22] Filed: May 13, 1986

[51] Int. Cl.⁴ G08C 21/00; G02F 1/13; G06K 15/18

[52] U.S. Cl. 178/18; 340/712

[58] Field of Search .... 178/18, 19; 340/365 VL, 340/784, 711, 712

[56] References Cited

U.S. PATENT DOCUMENTS

4,224,615 9/1980 Penz 340/712

OTHER PUBLICATIONS
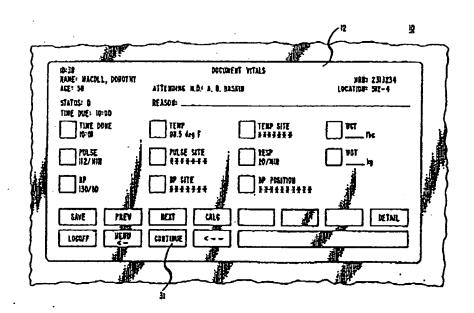
Article entitled "Ulticare puts a terminal in every patient room to save millions in nursing costs" Hospitals, Jan. 1, 1985, p. 85.

Primary Examiner—Stafford D. Schreyer
Attorney, Agent, or Firm—Robert O. Nimtz; Henry T. Brendzel
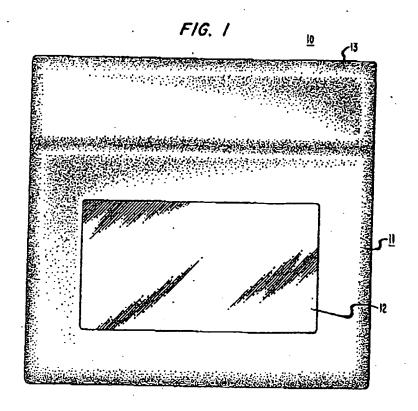
[57]　　　ABSTRACT
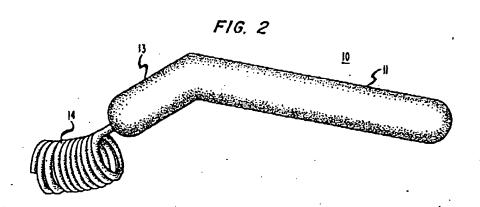
A computer terminal device includes a flat screen display element and a touch-sensitive element. Simulated keyboards can be displayed on the display element and, in response to the touching of the simulated keys, generate appropriate control signals. The same flat screen display can also be used to display computer output, either the result of calculations or the result of information retrieval requests. The slim silhouette of this terminal makes it ideal for hostile environments such as the factory floor or the hospital room.

4 Claims, 9 Drawing Figures
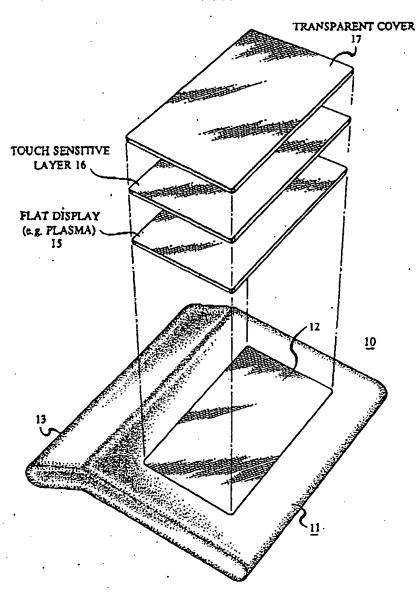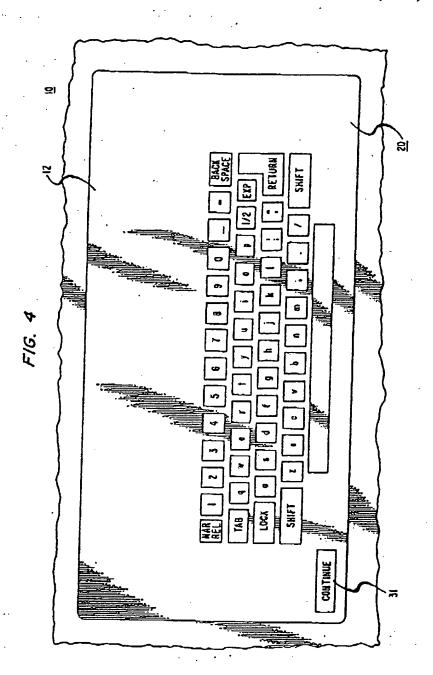
FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

10:30

DOCUMENT VITALS

NAME: MACOLL, DOROTHY
AGE: 58   ATTENDING M.D.: A. B. BASKIN   MRN: 23J3234
                                                                LOCATION: 512-4
STATUS: O   REASON:
TIME DUE: 10:00

TIME DONE [ ] TEMP [ ]   TEMP SITE [ ]   WGT [ ] ____ lbs
10:01   98.5 deg F   ********
PULSE [ ]   PULSE SITE [ ] RESP [ ]   WGT [ ] ____ kg
112/MIN   ********   20/MIN
BP [ ]   BP SITE [ ]   BP POSITION [ ]
130/80   ********   **********

SAVE   PREV   NEXT   CALC   DETAIL

LOGOFF MENU   CONTINUE < - >
        < - >

FIG. 7

FIG. 8

FIG. 9

4,725,694

1
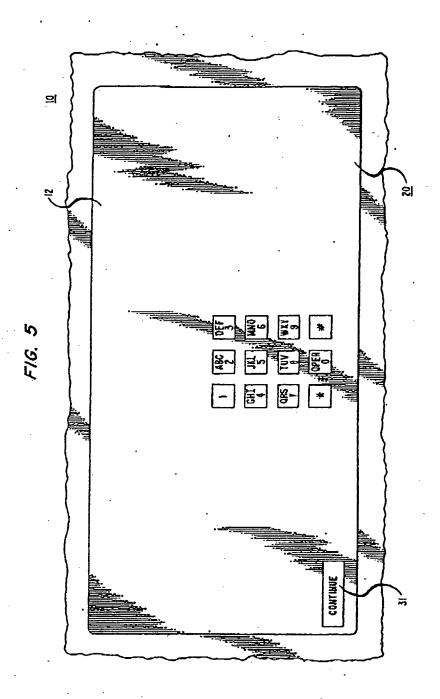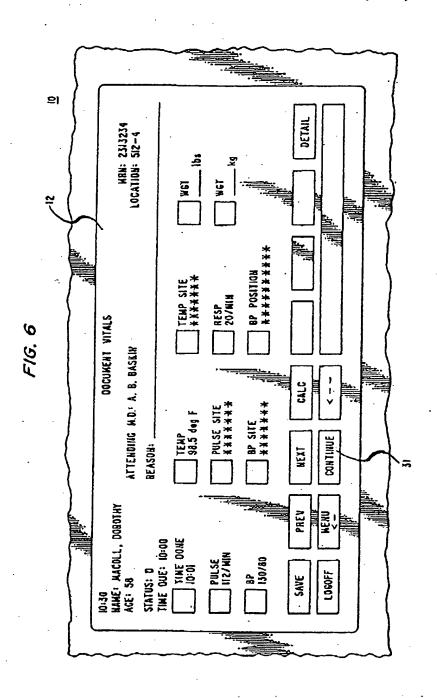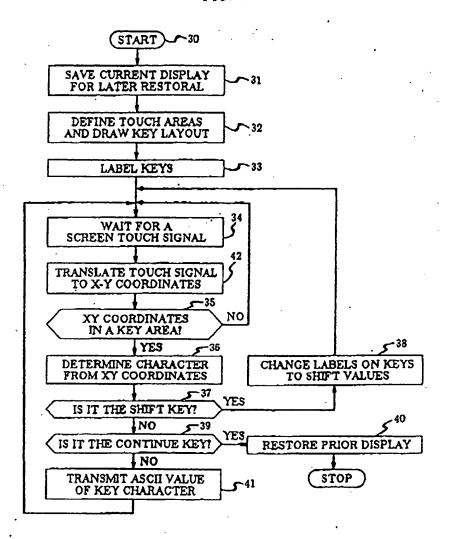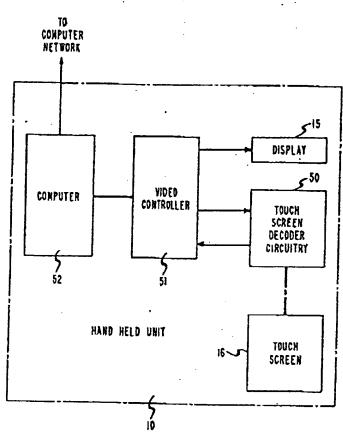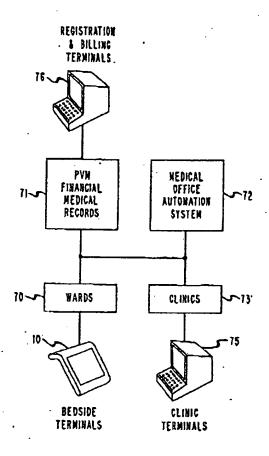
COMPUTER INTERFACE DEVICE

TECHNICAL FIELD

This invention relates to computers and computer terminals, and more particularly, to small, compact and light-weight terminal devices for computers and computer systems.

BACKGROUND OF THE INVENTION

Flat display electroluminescent and plasma display devices are well-known and have long been incorporated into computer terminal devices, particularly for portable terminals and for portable computers. Such portable computers are sometimes called "smart" terminals or personal computers or work stations. While such flat screen devices substantially reduce the size of computer terminals, the standard keyboard, key pads, "mice," and other input devices have required that even "portable" terminals be relatively bulky despite the thin screen display.

It is also well-known to provide a touch-sensitive display screen for computer terminals. By touching the screen at or near indicia displayed on the screen, the user can select actions or graphic display portions for further consideration or action. Thus, in response to a touch, a command can be selected from a menu for execution, a graphical element can be selected for enlargement, movement or replication, or a data file can be selected for processing. Such touch-responsive selections have the disadvantage, however, of being totally dependent on the specific application for which they were designed. General purpose input devices, such as typewriter-type keyboards, were therefore also necessary for generalized inputting.

SUMMARY OF THE INVENTION

In accordance with the illustrative embodiment of the present invention, a light, portable, compact computer terminal is provided by combining a flat screen display device with a touch-sensitive overlayer. All or a portion of the display surface is used to simulate a standard input device such as a standard "q-u-e-r-t-y" typewriter keyboard or a touch-tone numerical telephone keypad. Simultaneously with the display of the simulated input device, the areas of the display corresponding to specific signals (alphanumerics, for example) are correlated with the generation of the corresponding signals, ASCII codes, for example.

It can be seen that a touch-sensitive screen in accordance with the present invention can serve all of the input and output needs of a computer terminal. A programmed microprocessor associated with the terminal can be used to provide the screen displays and generate the appropriate signals in response to touching the corresponding selected portions of the screen. Such a device can be considerably more compact than heretofore available computer terminals. True portability of a computer terminal in accordance with the present invention, particularly in a busy, and sometimes hostile, work environment, permits such a terminal to be used as an electronic clipboard, but with all of the processing power of a large computer.

In accordance with one feature of the present invention, the electronic clipboard terminal can be connected, by wires or by standard wireless technology, to minicomputers or large main frame computers to obtain

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the advantages of complex computing capability and access to large data bases.

In accordance with another feature of the present invention, the portable terminal can be used to simulate a standard keyboard, a standard telephone key pad, a standard numerical key pad, a stenographic machine, or any other standard finger-operated data input device. Moreover, the same screen which is used as a simulated input device can also be used as a standard output or display device, either at different times or at different locations ("windows") on the display surface. Finally, such versatility is entirely under the control of software in a digital computer and hence can be called upon automatically in response to computer-derived signals. In this way, a standard simulated keyboard is displayed only at those times when alphabetic input is appropriate, a numerical key pad is displayed only when numeric input is appropriate, a telephone key pad is displayed only when a telephone number must be supplied, and so forth.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a computer terminal in accordance with the present invention;

FIG. 2 is a side view of the computer terminal of FIG. 1;

FIG. 3 is an exploded perspective view of the terminal of the present invention showing the construction of the multilayer screen;

FIG. 4 is a graphical representation of a standard typewriter keyboard display for use with the terminal of the present invention;

FIG. 5 is a graphical representation of a telephone key pad display for use with the terminal of the present invention;

FIG. 6 is a graphical representation of a display for a special application of the terminal of the present invention in the hospital environment;

FIG. 7 is a flowchart showing one application of the terminal of the present invention for the generation of standard typewriter alphanumeric ASCII codes to control a computer;

FIG. 8 is a detailed block diagram of the electrical circuits of the terminal of FIGS. 1 through 6; and

FIG. 9 is a block diagram of one application of a computer system in which the terminal of FIGS. 1 through 6 might be a part.

DETAILED DESCRIPTION

Referring more particularly to the drawings, FIGS. 1 and 2 are plan and elevation views, respectively, of a portable computer terminal in accordance with the illustrative embodiment of the present invention. As can be seen in FIG. 1, the terminal 10 has two planar surfaces 11 and 13 at an angle to each other. Planar surface 11 includes an opening 12 which provides visual access to a flat screen display device inside of terminal 1. As can best be seen in FIG. 2, the planar surfaces 11 and 13 define an angle of approximately 140 degrees therebetween. A retractile cord 14 may be attached to terminal 10 as means for connecting terminal 10 to computing facilities outside of terminal 10, should that be necessary or desireable. Alternatively, terminal 10 can be electrically coupled to such external computing facilities by well-known wireless technology using ultrasonic sound waves, radio waves, infra-red waves or other wireless media.

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In FIG. 3, there is shown an exploded view of portions of the terminal 10 to illustrate the construction of the display screen elements which fit into opening 13 of surface 11. This display area comprises a flat electroluminescent or plasma display screen 15, a touch-sensitive layer 16, and a transparent protective layer 17. These three layers are sandwiched together and are visible through the opening 13 on surface 11. Flat screen display devices are well-known in the art and will not be further described here. Not shown in FIG. 3 are the electrical wires and connections required to operate flat screen display screen 15.

Similarly, touch-sensitive layer 16 is also well-known in the art and will not be further described here. Not shown in FIG. 3 are the electrical wires and connectors required to operate the touch sensitive layer 16. It is sufficient for the present invention that touch-sensitive layer 16 be capable of discriminating between adjacent touched areas of a size commensurate with the size of the human fingertip.

It will be noted that the terminal device 10 is designed to be relatively thin and small for ease in portability. Moreover, the sandwich construction of the display screen assists in the terminal's thin profile and thus makes it possible for the terminal device of the present invention to be used as an electronic clipboard in relatively hostile environments such as the factory floor or the hospital patient's room. The transparent protective layer 17, for example, may be so constructed and so sealed to the surface 11 as to protect components inside of terminal 10 from corrosive or damaging elements in the environment in which terminal 10 is used.

In accordance with the present invention, the terminal 10 operates as both an input and an output device for a computer which may comprise a microprocessor included inside of the case of terminal 10 or which may comprise a separator computer to which terminal 10 is connected. The connection between terminal 10 and such a computer can be had by way of retractor cord 14 (to permit relative mobility of terminal 10) or by a wireless connection such as is commonly found in home entertainment units using wireless remote control devices. In any event, and in accordance with the present invention, the terminal 10 includes a display surface 20 on which there can be displayed a plurality of diverse keyboard simulations. The touch-sensitive layer 16 is then used to identify the various key areas of such displayed keyboards and to generate appropriate electrical signals in response to the touch of each of the graphically defined key areas. This capability permits the terminal 10 to operate as if it included a plurality of different mechanical keyboards. Indeed, and in further accordance with the present invention, different varieties of simulated keyboards can be displayed on surface 20, depending on the particular needs of the user.

One example of such a simulated keyboard is shown in FIG. 4, where there is shown a display of a standard typewriter keyboard which can be used as an input device for standard alpha-numeric characters for inputting standard text. The keyboard display of FIG. 4 may also be used for standard text processing chores such as editing. In the alternative, and as shown in FIG. 5, the display surface 20 may be used to display a standard telephone key pad which can be used to establish telephone connections with remote computers or remote data bases when desired by the user of terminal 10. Finally, and as illustrated in FIG. 6, the terminal 10 may have displayed in display area 20 keys which are totally

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dependent on the particular application for which the terminal 10 is used.

In FIG. 6, for example, there is shown a display suitable for a terminal 10 used in a hospital room environment where it is necessary to collect and record the vital signs for a particular patient. Across the top of the display of FIG. 6 appears identifying information concerning the particular patient. Also included in FIG. 6 are a plurality of key areas which the user may touch in order to indicate the particular type of data being submitted. Following the touching of one of these keys, a standard numerical keyboard can be displayed for inputting numerical data or a standard typewriter keyboard as shown in FIG. 4 may be displayed for inputting text. Thus, the application-dependent display of FIG. 6 can provide a mechanism for obtaining the use of application-independent input devices (FIGS. 4 and 5) for the collection of specific types of information. Each of the displays shown in FIGS. 4, 5 and 6 include a key 31 labelled "continue." Key 31 is used to return the display to whatever display was present before the current display. Thus, if, during the display of FIG. 6, the user wishes to input text for the "REASON" field near the top of the display of FIG. 6, the keyboard of FIG. 4 will be displayed for text input. Following the text input, the "continue" key 31 of FIG. 4 will be touched, thereby restoring the display of FIG. 6.

In order to better understand the operation of the terminal 10 of the present invention, the flowchart shown in FIG. 7 will now be discussed. In FIG. 7, there is shown a flow chart of a typical touch-screen keyboard operation. For illustrative purposes, a flowchart of the operation of the typewriter keyboard of FIG. 4 will be described, although the operation of other types of general purpose or application-dependent keying systems will be readily apparent to those skilled in the art from this description.

Turning then to FIG. 7, the keyboard operation starts at start box 30. In box 31, the current display which appears on the screen 20 is stored for later retrieval and restoral after the use of the typewriter keyboard is completed. In box 32, and under software control, the touchscreen areas which are to represent key areas are defined in x and y coordinates, and the visual appearances of the keys are drawn on the flat display screen 15 of FIG. 3. In box 33, the displayed key boxes are labelled with labels appropriate to the particular use of the simulated keyboard. For a typewriter keyboard, the labels shown in FIG. 4 would be appropriate. Of course, for other keyboards, i.e., the telephone key pad of FIG. 5, other labelling arrangements would be used. At box 34, the circuits of terminal 10 simply wait until the touch-sensitive screen 16 of terminal 10 detects the fact that the surface of the screen has been touched. When the screen is touched, box 34 translates the touch-responsive signals from layer 16 into x-y coordinates on the display surface. In decision box 35, the x-y coordinates of the touched point are compared to the predefined x-y coordinates associated with the displayed keys. If the touched point lies outside of all of such predefined key areas, then box 34 is reentered to await another touch-responsive signal.

If the coordinates of the touched point on the screen correspond to a predefined key area, then box 36 is entered to determine the particular character or numeral which that key is intended to generate. In decision box 37, it is determined whether that character corresponds to one of the shift keys on the typewriter

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tion subareas of said touch-responsive area for
providing informatin, with each defined subarea
developing a preselected signal for said computer
when touched, (b) a subarea for recalling a previ-
ously displayed pattern of primary information

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subareas, and (c) subareas for calling up for display
preselected other patterns of primary information
subareas.

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United States Court of Appeals,
Federal Circuit.

In re SANG-SU LEE.

No. 00-1158.

Jan. 18, 2002.

Board of Patent Appeals and Interferences rejected all claims of inventor's patent application directed toward method of automatically displaying functions of video display device that demonstrated how to select and adjust functions in order to facilitate response by user. Inventor appealed. The Court of Appeals, Pauline Newman, Circuit Judge, held that analysis by Board did not comport with either legal requirements for determination of obviousness or with requirements of Administrative Procedure Act (APA).

Vacated and remanded.

West Headnotes

[1] Patents ☜113(6)
291k113(6) Most Cited Cases

Tribunals of the Patent and Trademark Office (PTO) are governed by the Administrative Procedure Act (APA), and their rulings receive the same judicial deference as do tribunals of other administrative agencies. 5 U.S.C.A. § 551 et seq.

[2] Administrative Law and Procedure ☜485
15Ak485 Most Cited Cases

[2] Administrative Law and Procedure ☜507
15Ak507 Most Cited Cases

For judicial review to be meaningfully achieved within the strictures of the Administrative Procedures Act (APA), an agency tribunal must present a full and reasoned explanation of its decision; the agency tribunal must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. 5 U.S.C.A. § 706(2).

[3] Patents ☜113(6)
291k113(6) Most Cited Cases

Judicial review of a decision of the Board of Patent Appeals and Interferences denying an application for a patent is founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. 5 U.S.C.A. § 551 et seq.

[4] Patents ☜31.1
291k31.1 Most Cited Cases

As applied to the determination of patentability vel non when the issue is obviousness, it is fundamental that the rejection of a patent application must be based on evidence comprehended by the language of the statute addressing obviousness. 35 U.S.C.A. § 103.

[5] Patents ☜16.5(1)
291k16.5(1) Most Cited Cases

The patent examination process centers on prior art and the analysis thereof; when patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. 35 U.S.C.A. § 103.

[6] Patents ☜26(1)
291k26(1) Most Cited Cases

In the context of an obviousness determination by the Board of Patent Appeals and Interferences, the factual inquiry whether to combine references must be thorough and searching; it must be based on objective evidence of record. 35 U.S.C.A. § 103.

[7] Patents ☜111
291k111 Most Cited Cases

Analysis of invention by Board of Patent Appeals and Interferences did not comport with either legal requirements for determination of obviousness or with requirements of Administrative Procedure Act (APA) on basis that agency tribunal did not set forth findings and explanations needed for reasoned decisionmaking; examiner used conclusory statements to support his subjective belief that it was obvious that person skilled in the art would have been motivated to combine prior art, and Board rejected

need for any specific hint or suggestion in particular reference to support combination of prior art. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

[8] Patents ☜26(1)
291k26(1) Most Cited Cases

In an obviousness determination, the factual question of motivation to combine prior art is material to patentability, and cannot be resolved on subjective belief and unknown authority. 35 U.S.C.A. § 103.

[9] Patents ☜26(1)
291k26(1) Most Cited Cases

[9] Patents ☜111
291k111 Most Cited Cases

In an obviousness determination under patent law, it is improper, in determining whether a person of ordinary skill would have been led to combine references, simply to use that which the inventor taught against its teacher; thus, the Board of Patent Appeals and Interferences must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

[10] Administrative Law and Procedure ☜507
15Ak507 Most Cited Cases

Deferential judicial review under the Administrative Procedure Act (APA) does not relieve the agency of its obligation to develop an evidentiary basis for its findings; to the contrary, the APA reinforces this obligation. 5 U.S.C.A. § 706(2).

[11] Administrative Law and Procedure ☜763
15Ak763 Most Cited Cases

[11] Administrative Law and Procedure ☜796
15Ak796 Most Cited Cases

In the context of judicial review under the Administrative Procedure Act (APA), a decision by an agency tribunal that has an omission of a relevant factor required by precedent is both legal error and "arbitrary agency action." 5 U.S.C.A. § 551 et seq.

[12] Administrative Law and Procedure ☜485
15Ak485 Most Cited Cases

[12] Administrative Law and Procedure ☜760
15Ak760 Most Cited Cases

The foundation of the principle of judicial deference under the Administrative Procedures Act (APA) to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise; however, reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. 5 U.S.C.A. § 706(2).

[13] Patents ☜16(1)
291k16(1) Most Cited Cases

The determination of patentability on the ground of unobviousness is ultimately one of judgment; in furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. 35 U.S.C.A. § 103.

[14] Patents ☜16(3)
291k16(3) Most Cited Cases

[14] Patents ☜104
291k104 Most Cited Cases

[14] Patents ☜111
291k111 Most Cited Cases

In the context of an obviousness determination, the patent examiner and the Board of Patent Appeals and Interferences are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of the person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C.A. § 103.

[15] Patents ☜104
291k104 Most Cited Cases

In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board of Patent Appeals and Interferences are presumed to act from the viewpoint of a person having ordinary skill in the art to which the subject matter pertains; thus, when they rely on what they assert to be general knowledge to negate

patentability, that knowledge must be articulated and placed on the record and the failure to do so is not consistent with either effective administrative procedure or effective judicial review. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

[16] Patents ⬅111
291k111 Most Cited Cases

In the context of an obviousness determination, the Board of Patent Appeals and Interferences cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

[17] Administrative Law and Procedure ⬅326
15Ak326 Most Cited Cases

[17] Administrative Law and Procedure ⬅485
15Ak485 Most Cited Cases

[17] Administrative Law and Procedure ⬅507
15Ak507 Most Cited Cases

Sound administrative procedure requires that an agency apply the law in accordance with statute and precedent; the agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. 5 U.S.C.A. § 706(2).

Patents ⬅328(2)
291k328(2) Most Cited Cases

4,626,892. Cited As Prior Art.
*1340 Richard H. Stern, of Washington, DC, argued for Sang Su Lee. With him on the brief was Robert E. Bushnell.

Sidney O. Johnson, Jr., Associate Solicitor, of Arlington, Virginia, argued for the Director of the U.S. Patent and Trademark Office. With him on the brief were John M. Whealan, Solicitor, and Raymond T. Chen, Associate Solicitor. Of counsel were Maximilian R. Peterson and Mark Nagumo, Associate Solicitors.

Before PAULINE NEWMAN, CLEVENGER, and DYK, Circuit Judges.

PAULINE NEWMAN, Circuit Judge.

Sang-Su Lee appeals the decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office, rejecting all of the claims of Lee's patent application Serial No. 07/631,210 entitled "Self- Diagnosis and Sequential-Display Method of Every Function." [FN1] We vacate the Board's decision for failure to meet the adjudicative standards for review under the Administrative Procedure Act, and remand for further proceedings.

> FN1. *Ex parte Lee*, No.1994-1989 (Bd. Pat.App. & Int. Aug. 30, 1994; on reconsid'n Sept. 29, 1999).

The Prosecution Record

Mr. Lee's patent application is directed to a method of automatically displaying the functions of a video display device and demonstrating how to select and adjust the functions in order to facilitate response by the user. The display and demonstration are achieved using computer-managed electronics, including pulse-width modulation and auto-fine-tuning pulses, in accordance with procedures described in the specification. Claim 10 is representative:

> 10. A method for automatically displaying functions of a video display device, comprising:
> determining if a demonstration mode is selected;
> if said demonstration mode is selected, automatically entering a picture adjustment mode having a picture menu screen displaying a list of a plurality of picture functions; and
> automatically demonstrating selection and adjustment of individual ones of said plurality of picture functions.

The examiner rejected the claims on the ground of obviousness, citing the combination of two references: United States Patent No. 4,626,892 to Nortrup, and the Thunderchopper Helicopter Operations *1341 Handbook for a video game. The Nortrup reference describes a television set having a menu display by which the user can adjust various picture and audio functions; however, the Nortrup display does not include a demonstration of how to adjust the functions. The Thunderchopper Handbook describes the Thunderchopper game's video display as having a "demonstration mode" showing how to play the game; however, the Thunderchopper Handbook makes no mention of the adjustment of picture or audio functions. The examiner held that it

would have been obvious to a person of ordinary skill to combine the teachings of these references to produce the Lee system.

Lee appealed to the Board, arguing that the Thunderchopper Handbook simply explained how to play the Thunderchopper game, and that the prior art provided no teaching or motivation or suggestion to combine this reference with Nortrup, or that such combination would produce the Lee invention. The Board held that it was not necessary to present a source of a teaching, suggestion, or motivation to combine these references or their teachings. The Board stated:
> The conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference.

Board op. at 7. The Board did not explain the "common knowledge and common sense" on which it relied for its conclusion that "the combined teachings of Nortrup and Thunderchopper would have suggested the claimed invention to those of ordinary skill in the art."

Lee filed a request for reconsideration, to which the Board responded after five years. The Board reaffirmed its decision, stating that the Thunderchopper Handbook was "analogous art" because it was "from the same field of endeavor" as the Lee invention, and that the field of video games was "reasonably pertinent" to the problem of adjusting display functions because the Thunderchopper Handbook showed video demonstrations of the "features" of the game. On the matter of motivation to combine the Nortrup and Thunderchopper references, the Board stated that "we maintain the position that we stated in our prior decision" and that the Examiner's Answer provided "a well reasoned discussion of why there is sufficient motivation to combine the references." The Board did not state the examiner's reasoning, and review of the Examiner's Answer reveals that the examiner merely stated that both the Nortrup function menu and the Thunderchopper demonstration mode are program features and that the Thunderchopper mode "is user-friendly" and it functions as a tutorial, and that it would have been obvious to combine them.

Lee had pressed the examiner during prosecution for some teaching, suggestion, or motivation in the prior art to select and combine the references that were relied on to show obviousness. The Examiner's Answer before the Board, plus a Supplemental Answer, stated that the combination of

Thunderchopper with Nortrup "would have been obvious to one of ordinary skill in the art since the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software," and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial." The Board adopted the examiner's answer, stating "the examiner has provided a well reasoned discussion of these references and how the combination of these references meets the claim limitations." However, perhaps recognizing that the examiner had provided insufficient justification to *1342 support combining the Nortrup and Thunderchopper references, the Board held, as stated *supra*, that a "specific hint or suggestion" of motivation to combine was not required.

This appeal followed.

Judicial Review

[1] Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies. *Dickinson v. Zurko, 527 U.S. 150, 119 S.Ct. 1816, 144 L.Ed.2d 143, 50 USPQ2d 1930 (1999)*. Thus on appeal we review a PTO Board's findings and conclusions in accordance with the following criteria:
> 5 U.S.C. § 706(2) The reviewing court shall--
> (2) hold unlawful and set aside agency actions, findings, and conclusions found to be--
> (A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

> * * * * * *
> (E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute;

[2][3] For judicial review to be meaningfully achieved within these strictures, the agency tribunal must present a full and reasoned explanation of its decision. The agency tribunal must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. The Court has often explained:
> The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decisionmaking." Not only must an agency's decreed result be within the scope of its

lawful authority, but the process by which it reaches that result must be logical and rational. *Allentown Mack Sales and Service, Inc. v. National Labor Relations Bd., 522 U.S. 359, 374, 118 S.Ct. 818, 139 L.Ed.2d 797 (1998)* (citation omitted). This standard requires that the agency not only have reached a sound decision, but have articulated the reasons for that decision. The reviewing court is thus enabled to perform meaningful review within the strictures of the APA, for the court will have a basis on which to determine "whether the decision was based on the relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 416, 91 S.Ct. 814, 28 L.Ed.2d 136 (1971).* Judicial review of a Board decision denying an application for patent is thus founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. *See In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed.Cir.2001)* (review is on the administrative record); *In re Gartside, 203 F.3d 1305, 1314, 53 USPQ2d 1769, 1774 (Fed.Cir.2000)* (Board decision "must be justified within the four corners of the record").

[4][5] As applied to the determination of patentability *vel non* when the issue is obviousness, "it is fundamental that rejections under 35 U.S.C. § 103 must be based on evidence comprehended by the language of that section." *In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed.Cir.1983).* The essential factual evidence on the issue of obviousness is set forth in *Graham v. John Deere Co., 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966)* and extensive ensuing precedent. The patent examination *1343 process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. *See, e.g., McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed.Cir.2001)* ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the *Graham* factors).

[6] "The factual inquiry whether to combine references must be thorough and searching." *Id.* It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions,

and cannot be dispensed with. *See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed.Cir.2000)* ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding' ") (quoting *C.R. Bard, Inc., v. M3 Systems, Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed.Cir.1998)*); *In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed.Cir.1999)* ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); *In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed.Cir.1998)* (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); *In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed.Cir.1988)* (" 'teachings of references can be combined *only* if there is some suggestion or incentive to do so.' ") (emphasis in original) (quoting *ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed.Cir.1984)*).

The need for specificity pervades this authority. *See, e.g., In re Kotzab, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed.Cir.2000)* ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); *In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed.Cir.1998)* ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); *In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed.Cir.1992)* (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references").

[7][8][9] With respect to Lee's application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that

which Lee described. The examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question *1344 of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed.Cir.1983)*. Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.

[10] Deferential judicial review under the Administrative Procedure Act does not relieve the agency of its obligation to develop an evidentiary basis for its findings. To the contrary, the Administrative Procedure Act reinforces this obligation. *See, e.g., Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co., 463 U.S. 29, 43, 103 S.Ct. 2856, 77 L.Ed.2d 443 (1983)* ("the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.' ") (quoting *Burlington Truck Lines v. United States, 371 U.S. 156, 168, 83 S.Ct. 239, 9 L.Ed.2d 207 (1962)); Securities & Exchange Comm'n v. Chenery Corp., 318 U.S. 80, 94, 63 S.Ct. 454, 87 L.Ed. 626 (1943)* ("The orderly function of the process of review requires that the grounds upon which the administrative agency acted are clearly disclosed and adequately sustained.").

[11] In its decision on Lee's patent application, the Board rejected the need for "any specific hint or suggestion in a particular reference" to support the combination of the Nortrup and Thunderchopper references. Omission of a relevant factor required by precedent is both legal error and arbitrary agency action. *See Motor Vehicle Manufacturers, 463 U.S. at 43, 103 S.Ct. 2856* ("an agency rule would be arbitrary and capricious if the agency ... entirely failed to consider an important aspect of the problem"); *Mullins v. Department of Energy, 50 F.3d 990, 992 (Fed.Cir.1995)* ("It is well established that

agencies have a duty to provide reviewing courts with a sufficient explanation for their decisions so that those decisions may be judged against the relevant statutory standards, and that failure to provide such an explanation is grounds for striking down the action."). As discussed in *National Labor Relations Bd. v. Ashkenazy Property Mgt. Corp., 817 F.2d 74, 75 (9th Cir.1987)*, an agency is "not free to refuse to follow circuit precedent."

[12] The foundation of the principle of judicial deference to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise. Reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. *See Baltimore and Ohio R.R. Co. v. Aberdeen & Rockfish R.R. Co., 393 U.S. 87, 91-92, 89 S.Ct. 280, 21 L.Ed.2d 219 (1968)* (absent reasoned findings based on substantial evidence effective review would become lost "in the haze of so-called expertise"). The "common knowledge and common sense" on which the Board relied in rejecting Lee's application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. Conclusory statements such as those here provided do not fulfill the agency's obligation. This court explained in *Zurko, 258 F.3d at 1385, 59 USPQ2d at 1697*, that "deficiencies of the cited references cannot be remedied by the Board's general conclusions about what is 'basic knowledge' or 'common sense.' " The *1345 Board's findings must extend to all material facts and must be documented on the record, lest the "haze of so-called expertise" acquire insulation from accountability. "Common knowledge and common sense," even if assumed to derive from the agency's expertise, do not substitute for authority when the law requires authority. *See Allentown Mack, 522 U.S. at 376, 118 S.Ct. 818* ("Because reasoned decisionmaking demands it, and because the systemic consequences of any other approach are unacceptable, the Board must be required to apply in fact the clearly understood legal standards that it enunciates in principle....")

The case on which the Board relies for its departure from precedent, *In re Bozek, 57 C.C.P.A. 713, 416 F.2d 1385, 163 USPQ 545 (1969)*, indeed mentions "common knowledge and common sense," the CCPA stating that the phrase was used by the Solicitor to support the Board's conclusion of obviousness based on evidence in the prior art. *Bozek* did not hold that common knowledge and common sense are a

substitute for evidence, but only that they may be applied to analysis of the evidence. _Bozek_ did not hold that objective analysis, proper authority, and reasoned findings can be omitted from Board decisions. Nor does _Bozek,_ after thirty-two years of isolation, outweigh the dozens of rulings of the Federal Circuit and the Court of Customs and Patent Appeals that determination of patentability must be based on evidence. This court has remarked, in _Smiths Industries Medical Systems, Inc. v. Vital Signs, Inc.,_ 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed.Cir.1999), that _Bozek_ 's reference to common knowledge "does not in and of itself make it so" absent evidence of such knowledge.

[13][14][15][16] The determination of patentability on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

Alternative Grounds

At oral argument the PTO Solicitor proposed alternative grounds on which this court might affirm the Board's decision. However, as stated in _Burlington Truck Lines, Inc. v. United States,_ 371 U.S. 156, 168, 83 S.Ct. 239, 9 L.Ed.2d 207 (1962), "courts may not accept appellate counsel's _post hoc_ rationalization for agency action." Consideration by the appellate tribunal of new agency justifications deprives the aggrieved party of a fair opportunity to support its position; thus review of an administrative decision must be made on the grounds relied on by the agency. "Ifthose grounds are inadequate or improper, the court is powerless to affirm the administrative action by substituting what it considers *1346 to be a more adequate or proper basis." _Securities & Exchange Comm'n v. Chenery Corp.,_ 332 U.S. 194, 196, 67 S.Ct. 1575, 91 L.Ed. 1995 (1947). As reiterated in _Federal Election Comm'n v. Akins,_ 524 U.S. 11, 25, 118 S.Ct. 1777, 141 L.Ed.2d 10 (1998), "If a reviewing court agrees that the agency misinterpreted the law, it will set aside the agency's action and remand the case--even though the agency (like a new jury after a mistrial) might later, in the exercise of its lawful discretion, reach the same result for a different reason." Thus we decline to consider alternative grounds that might support the Board's decision.

Further Proceedings

[17] Sound administrative procedure requires that the agency apply the law in accordance with statute and precedent. The agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. In _Radio-Television News Directors Ass'n v. FCC,_ 184 F.3d 872 (D.C.Cir.1999) the court discussed the "fine line between agency reasoning that is 'so crippled as to be unlawful' and action that is potentially lawful but insufficiently or inappropriately explained," quoting from _Checkosky v. Securities & Exch. Comm'n,_ 23 F.3d 452, 464 (D.C.Cir.1994); the court explained that "[i]n the former circumstance, the court's practice is to vacate the agency's order, while in the latter the court frequently remands for further explanation (including discussion of the relevant factors and precedents) while withholding judgment on the lawfulness of the agency's proposed action." _Id._ at 888. In this case the Board's analysis of the Lee invention does not comport with either the legal requirements for determination of obviousness or with the requirements of the Administrative Procedure Act that the agency tribunal set forth the findings and explanations needed for "reasoned decisionmaking." Remand for these purposes is required. _See Overton Park,_ 401 U.S. at 420- 421, 91 S.Ct. 814 (remanding for further proceedings appropriate to the administrative process).

VACATED AND REMANDED.

277 F.3d 1338, 61 U.S.P.Q.2d 1430

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